snowdozer

3030

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"WHAT'S THE MOST INTERESTING THING YOU OWN?"

Happy ${(new Date()).toISOString()}, my loveliest readers!

The boomers among us[1] may be thinking, "Oh no… the **mathNEWS** editor voice in my head narrating the **mastHEAD** sounds oddly familiar…" For those of you who weren't around for the terms Winter 2021–Winter 2022 (both inclusive), I was a **mathNEWS** editor back then. Unfortunately, I then decided to not be editor for the terms Spring 2022–Spring 2023. Fortunately, all that's in the past — I'm back now![2]

And what a wonderful welcome I have had. Not only am I in company of an all-new editorial team, but we've had some fantastic taste in pizza at the past two production nights! At the first production night (when the **mastHEAD** was taken over by the lovely classifiED), the None Pizza Faction finally achieved a key breakthrough, and somehow let None Pizza With Chicken slip past evaluatED long enough that he didn't realize what he was ordering until he was talking to the Pizza Nova people on the phone. You should've seen his face, it was great. Also great was my face when I had to finish that pizza because nearly nobody who voted for it ate it. -_-

Anyway! This prod night was even better, because a few enterprising writers brought along a box filled with the greatest treasure known to studentkind — Campus Lazeeza. And unlike the other meme pizza, this one was gloriously delicious.

evaluatED's review of the Lazeeza is in the **blackBOX** below. :D

caffeinatED
Editor, **mathNEWS**

1. haha among us
2. Feel free to say, "Hi, back now! I'm Dad." when you see me next.

ARTICLE OF THE ISSUE

It's rare these days to see math in **mathNEWS**. Lucky for us, we have GMATH 101: Intro to Girl Math by cherry ♡ and Σ Diet Coke. Gift card in MC 3030. Good luck splitting it in half.

evaluatED
Editor, **mathNEWS**

WHOLE NUMBER HAVER	this copy of **mathNEWS**
SEXY_SOFTWARE_BABE	2 refills of 0.7mm pencil lead for my 0.5mm mechanical pencils
ANDOIII	a cute dragon plushie made for ages 0+
SOMEBODY	A disembodied sink faucet that I bought for $2.99 at a yard sale at camp in the middle of the night
ASPIRO	A Quebec high school math textbook from 1897
YALEVOYLIAN	A purple cauliflower
SNOWDOZER	A rusted metal pink pencil case from my first year in high school, covered in Dollarama Paw Patrol stickers
ROCKFACTS	I have a lovely Labradorite sample <3 It's iridescent B)
DICK SMITHERS	Your Wallet. That's Right. Check Your Pockets. It's Gone.
COMMONDIYAR	EPBT RamenStop Keycaps
MOLASSES	a rusty model train made entirely of washers and nuts
UW UNPRINT	ugo-ii.com
PEACELOVEMATH	underwater mp3 player
RAPIDEYEMOVEMENT	a small booklet featuring crack-smoking cats, sitting on the shelf next to a larger booklet about transmasculine gay sex
HYPERLYNX	Programming socks :3
APHF	A room next to Lars Nootbaar
LARS NOOTBAAR	A room next to Aphf
WINK WONK	a big collection of money from around the world (in case i need to run from police)
TENDSTOFORTYTWO	An Eaton Viking Custom typewriter that I swear I'll fix someday (it mostly works, just a bit buggy)
ROBBOTC	My Sanity
YUMMYPI	Cool rock from a beach
NORMALPARAMETERS	far too many CDs for one person in 2023
__INIT__	A Windows XP tablet/laptop hybrid that I pulled out of an e-waste bin in EIT
JOESUNSUNJOE	an eggplant stuffie
NOT A N*RD	A sword from medieval Europe (it's not edgy to own if it's *historic*)
BOLDBLAZER	Old coins? Old Pokemon cards? Empty factory-sealed food products? Limited edition Translink Compass Cards? One must be interesting, right?
DISTRACTED	Wizard101 Lvl. 60 Grandmaster account
CAFFEINATED	My Hydroflask mug, filled with coffee.

Humanity will destroy itself in its doomed quest to manufacture God.

EVAN GIRARDIN, mathNEWS EDITOR FOR FALL 2023
ALONG WITH DANIEL MATLIN, AWAB QURESHI, NAMAN SOOD, AND ISABELA SOUZA

math**ASKS** 153.2
FEATURING PROFESSOR JERRY WANG

YALEVOYLIAN: WHAT'S YOUR FAVOURITE "CONTEST MATH" THEOREM?

Squares of real numbers are non-negative.

There aren't really many "contest math" theorems, maybe Lifting the Exponent and Pigeonhole. It is more about finding the right idea than hitting it with the right theorem.

JEFF: WHAT'S YOUR RESEARCH ALL ABOUT?

Currently, my research is about how often the values of a given polynomial with integer coefficients are squarefree. For example, for the polynomial x, this is the problem of the density of squarefree integers, which we know to be $6/\pi^2$ which is the product of the local densities $1 - 1/p^2$ over all primes. The main content of problems of this kind is proving that the product of the local densities gives the correct answer.

AEGERITA: WHAT IN YOUR OPINION IS THE MOST IMPORTANT QUALITY FOR A SUCCESSFUL CAREER IN MATHEMATICS?

I am not sure if I am qualified to answer this question! Be open to ideas. Be both brave and careful when taking leaps of faith.

AMIRDADP: WHERE/HOW DO YOU GET THE BUDGET FOR ALL THE PIZZAS AT THE PUTNAM PREP SESSIONS?

The math faculty is very supportive of all contest related activities. I am very grateful for their generosity!

PREDAP: WHAT ARE YOUR THOUGHTS ON THE UPCOMING CONSTRUCTION OF M4?

I hope they have blackboards. I didn't really look into it to be honest.

BOLDBLAZER: I SIGNED UP FOR THE REGULAR EMAILS ON THOSE MATH CONTESTS IN MY FIRST YEAR, BUT I NEVER ENDED UP GOING TO ANY OF THEM FOR COMPLICATED REASONS. WHAT DID I MISS OUT ON?

The pain of getting stuck by a simple looking problem. The joy of suddenly finding the correct idea. The shame of why you didn't think of it earlier. And some free food.

DICK SMITHERS: THE FORM I USED TO FILL OUT THIS QUESTION DESCRIBES YOU AS A "BIG CONTEST GUY". HOW MANY CONTESTS DO I NEED TO PARTICIPATE IN BEFORE PEOPLE WILL REFER TO ME AS A "BIG CONTEST GUY"?

It is clickbait. Probably when you start hosting them :)

TERMINAL: WHAT'S YOUR RANKING OF STARBUST FLAVOURS?

What is Starbust?

ʰ∪: WHAT IS YOUR IDEAL CLASS SIZE?

I like my ideal class group trivial. I wouldn't mind 37 as the first irregular prime.

WHOLE NUMBER HAVER: ADMIT IT, DO YOU INTENTIONALLY SCARE INCOMING FIRST-YEARS WITH YOUR CONTENT TO WEED OUT PEOPLE LIKE ME? IT WORKED :/

When I taught MATH 135, I get a lot of people switching in from MATH 145 after the midterm and they would then have to catch up on half a semester of MATH 135 material. So I wanted to help people make the decision as early as possible!

0.423: HOW WOULD YOU EXPLAIN CATEGORY THEORY TO A FIRST YEAR?

Instead of describing a set (with possibly some extra structure) by what elements it has, describe it by what functions out of it and/or what functions in to it look like.

NAZZ: HOW WOULD YOU COMPARE CONTEST MATH TO THE MATH WE ARE TAUGHT IN CLASSES? WHAT RELATIONSHIP IS THERE BETWEEN BEING PROFICIENT IN ONE AND THE OTHER?

Doing well in contest math typically implies doing well in classes. They are both about solving problems that typically have somewhat short solutions. Moreover, people who do well in contest math tend to already know a lot of the class material. The converse is hard to say because for most people, doing well in contests is a random event!

Research mathematics is a bit different though. Doing original work requires having a sense of what is "natural" so that you have a higher chance of creating something useful.

NUT: WHAT IS YOUR FAVOURITE PART OF TEACHING MATH 145?

It is a great experience and pleasure to teach students who are extremely motivated and want to learn more!

I also have complete freedom in what to cover, besides the bare minimum of course. I actually learned quite a lot of new math while preparing for it! It is also fun to figure out elementary methods to prove a theorem that is typically proved using more advanced machinery (for example proving that a certain integer combinations of powers of the roots of unities is an integer without using Galois theory).

TENDSTOFORTYTWO: HOW DID YOU DESIGN YOUR HOMEPAGE? I NOTICE THAT A LOT OF PROFESSORS DO A SIMILAR (BUT NOT QUITE THE SAME) PLAIN-HTML STYLE. IS THERE A TEMPLATE FOR THIS OR DO YOU ALL DO IT BY HAND?

I copied it from someone, who copied it from someone else, when I was a graduate student. You can save the webpage and open and edit the .html file with Notepad.

I'VE BEEN LISTENING TO THE MOUNTAIN GOATS ON REPEAT

AND HERE'S WHY YOU SHOULD TOO

They're just that good.

Okay, but on an actual note — I feel like I've had people recommending the Mountain Goats music to me for years now, and for a long time, I didn't really *get* it. His voice felt off to me — what I now hear as raw, emotional, and familiar. The lyrics felt both too deep and too random — now I can connect with them each in my own way. (Some of them I think I still don't *get*, not really, but what does that matter — I enjoy them anyway.)

I'm not saying you'll like the Mountain Goats, but if you, like me, have heard about them from too many people to ignore, maybe give them a shot. (If you've never heard about them, also give them a shot.)

Currently, some favourites (though they change all the time) are:

- Hebrews 11:40
- Autoclave
- Tidal Wave
- Matthew 25:21
- Heretic Pride
- Cry for Judas
- Dance Music

I don't necessarily think this list is a particularly good "Here's the best place to start with this band" list, but I'm sure you can find a list like that somewhere if you want one. I'm just here to share my vibes. Hope you have a great day.

normalparameters

PS: If you're the kind of person who likes to hear artists talk about their work, I highly recommend the podcast "I Only Listen to the Mountain Goats", with lead singer John Darnielle. I think it's still an enjoyable listen even if you don't know the music (though I did know the music when I listened, so take that with a grain of salt).

UGO II F23 LETTER TO SHAREHOLDERS

To our shareowners:

In UGO II's very first letter to the shareholders in summer 2020, our President of Newsletter Services wrote about our intent to someday rule the world. We were in a period of breakneck growth. Despite only having 6 employees, we were making our first real estate purchases in New York and Beijing. It was a time of great excitement, and so he wrote: "make life a celebration."

We've come a long way since then. This year, we celebrated our 420th scrum, launched our game development studio Ugatu, and announced our President Bobby's campaign for the 2024 US election. UGO II Web Services, the backbone of our digital presence, now serves powerful clients such as **mathNEWS**. Talks have even started to consider a UGO II internship program for University of Waterloo students.

Along the way, we've created immeasurable value for shareowners, employees, and customers. As a not-for-cost company, it is not always easy to create monetary value. Indeed, the nominal balance sheet still remains in the 4-figure range. On paper, we make small investments, and get small returns.

But there is more to life than money. There is physical growth, like our American Samoa headquarters built with our bare hands. There is career growth: our President of Newsletter Services is now our Chief Technical Officer and head of UGO II Web Services.

And there is personal growth. We are pleased to announce that our President and CEO Bobby is getting married. This move will not interrupt his 2024 campaign — if anything, it will strengthen it. Congrats to Bobby and the soon-to-be First Lady!

Thank you for being part of this journey with us. Looking ahead through 2024, we share with you our fundamental management and decision-making approach.

- We will continue to focus relentlessly on expanding our product lines.
- We will continue our not-for-cost strategy.
- We will still make bold monetary investments where necessary for the physical, career, and personal growth of our stakeholders.
- We will continue to learn from our successes and laugh about our failures.
- And of course, Bobby will win the election by a landslide.

Make life a celebration.

Chief Data Officer, UGO II

WHICH ROCK IN THE PETER RUSSELL ROCK GARDEN ARE YOU?

FUN FACT! PETER RUSSELL IS STILL ALIVE :O

WHAT BEST DESCRIBES YOU?

1. You're fresh and ready for whatever life throws at you
2. You have lots of layers
3. Intense moments in your past have had a great impact on you
4. Boulder

WHAT IS YOUR GREATEST STRENGTH?

1. Your fiery disposition
2. Your amazing note-taking skills
3. You work great under pressure
4. Boulder

PICK YOUR FAVOURITE COLOUR.

1. Blue
2. Yellow
3. Green
4. Grey

PICK A RANDOM WORD WITH DEFINITELY NO MEANING.

1. Plagioclase Feldspar
2. Arsenopyrite
3. Serpentinites
4. Crinoids

WHAT IS YOUR DREAM CANADIAN VACATION?

1. Portaging across northern Ontario
2. Dogsledding in the Northwest Territories
3. Hiking in BC
4. Historic Ghost Tour in Alberta

PICK YOUR FAVOURITE GEOLOGIC TIME PERIOD.

1. Archean
2. Precambrian
3. Carboniferous
4. Carboniferous again

WHAT WERE YOU OBSESSED WITH AS A CHILD?

1. Volcanoes
2. Fossils
3. Gemstones
4. Natural disasters

DO YOU BELIEVE IN THE HEALING POWER OF CRYSTALS?

1. No
2. I believe they can have an immense impact on your health
3. Yes *glitter emoji*
4. Boulder

ROCKS?

1. Rocks!!!!
2. Rocks :^)
3. Rocks <3
4. Rocks >:)

Mostly 1's: You are Anorthosite! A phaneritic Intrusive Igneous rock. This specific sample was found in River Valley Ontario.

Mostly 2's: You are Giant Mine Breccia! A sedimentary rock from the (in)famous Giant mine in Yellowknife. This mine is known for producing lots of gold and even more toxic arsenic dust.

Mostly 3's: You are Nephrite Jade! This stunning specimen is from British Columbia. It is naturally green but has some white veins due to weathering.

Mostly 4's: You are the Frank Slide Boulder. The Frank Slide is one of the deadliest landslides in Canadian history. Over 70 people were killed but 23 children escaped, so silver linings I guess.

rockfacts

MUSHROOMS ARE GREAT
THINGS YOU DIDN'T KNOW ABOUT MUSHROOMS

- mushrooms are the only produce source of vitamin D
- portobello mushrooms contain more potassium than a banana
- mushrooms are air benders. they create their own wind to spread spores
- laetiporus sulphureus tastes like fried chicken
- they can glow in the dark
- more than 2000 new fungi are discovered each year
- if you rlly like mushrooms, read Little Mushroom

floot

CAH IS A BORING GAME, BUT THE COMPANY, AND ITS INITIATIVES, ARE NOT

PT. 1

It's no secret that Cards Against Humanity, at its core, is an adult knockoff version of the popular[1] board game Apples to Apples. It consists of the very basic play pattern of one player drawing a random black card from the box as a "prompt" of sorts, and the other players choosing from their hand of white "response" cards to try to make the first player laugh the hardest. The game in concept is good, but in practice, it generally fizzles out after a few rounds with tensions between players being greater than they started.

Despite this, however, the company that created CAH and continues to create expansion packs for the game is somehow one of the most interesting things I've ever stumbled upon while tumbling down an internet rabbit hole.

My interest in this company was piqued when I saw a Reddit post[2] on r/CuratedTumblr about how in 2013, CAH held an "anti-sale" on Black Friday where they raised all of their products' prices by $5 (USD) for *Today only!* They still had a sales spike and maintained their best-selling status on Amazon. This post also includes a follow-up of CAH's satirical "pink sale," with an advertisement for the *all-new Cards Against Humanity For Her* which was the exact same CAH game except it cost, you guessed it, $5 USD more with the only difference being the box being neon pink.

This post reminded me of a previous story I'd read about the company when they offered customers the opportunity to donate money in order to dig a massive hole in the ground and then fill it back in. For no reason. When asked, "Why don't you donate this money to charity?" the company responded, "Why don't *you* donate this money to charity?" Good point.

Here is a list of some of the other shitpost-worthy things they've done:

- Filled their pride expansion packs with glitter. A LOT of glitter.
- Pulled all their products from their website for another Black Friday and only selling, for $6 USD apiece, "Bullshit." It sold out within 2 hours: purchasers received actual bull shit packed in the classic CAH boxes[3]
- Ran a ~~sale~~ promotion where customers could give CAH $5. They forced people to click a checkbox before proceeding to checkout stating "I understand I am giving Cards Against Humanity $5 and receiving nothing in return." They made $71,145 off of this.

In that "Give CAH $5" promotion, the company decided to distribute the money among their employees, who kept track of how the money was spent. Many of the employees donated their portions to charities such as Planned Parenthood, animal rescues, and refugee support. Some employees bought tickets to Cubs games, or expensive whiskey and scotch. Some paid fees for divorce lawyers. One brave soul, *with full knowledge that they would be reporting how the funds were spent,* chose to spend their money on a $3120 gold-plated vibrator. That money could cover like, half of my tuition for a term. Probably closer to ¾ actually, given that the price was given in USD. Kinda makes you think about what's really important in life.

Apparently, some of the recipients spent the money on paying ~~back~~ down their student loans. I retract my previous statement that could have been construed as me throwing shade at the university for tuition prices. It could be so much worse.

So far, these all probably sound like frivolous ventures at best, or actively harmful[4] at worst. But I have yet to tell you of the one thing that ultimately tips the scales heavily in favour of me *actually liking a company* for the first time in my life. And this would be their "Your State Sucks" campaign. Buckle up, because this is probably about to get controversial (even though this **REALLY SHOULDN'T** be a controversial issue).

What is the "Your State Sucks" campaign, you might ask? Let me give you a hint: This campaign took place shortly after Roe v. Wade was overturned by the Supreme[5] Court of the United States.

When this whole fiasco took place, CAH was in the process of releasing new expansion packs, as they often are. This time, however, they did something a little bit different. They promoted that with each purchase from a state affected[6] by the overturning of Roe v. Wade, the company would donate 100% of the profits to the National Network of Abortion Funds, with no extra cost on top for the customers. CAH offered the option to opt out of the donation at checkout — but when the donation option was declined, CAH would tell them they suck, add an asshole tax on top, and tell them they'll donate on purchase anyway. Just now, the company would donate even more.

As a cherry on top, they also donated $100k as soon as they found out that the case had been overturned. But it doesn't end there, either:

> [CAH] *also wanted to know what on earth the people in your state were thinking, so we asked them a few questions. You will unfortunately believe what we found.*

Some of the takeaways from this survey, polling from those living in forced-birth states[6]:

- \>50% of anti-choice assholes surveyed wanted to imprison or **EXECUTE** women who get abortions
- 1 in 4 still think abortion should be illegal even if the mother will otherwise die

- 7 in 10 think that "casual sex" is a MAJOR problem, and 5 in 10 think that banning abortion will fix this "problem"
- 41% of men and 28% of women in forced-birth states believe that pregnancy has four TRImesters[7]
- 40% of men and 20% of women wrongly believe that embryos resulting in ectopic pregnancies can survive to be born. 52% of men and 26% of women wrongly believe that these embryos can be re-implanted into the uterus.

These results were terrifying to read, especially seeing as this was coming from one of the supposedly "most advanced" countries of our time. This is where I stopped looking into this campaign of CAH's, but I will certainly continue in the next issue. In the meantime, I encourage you to continue looking into this topic.

Thanks for reading.

sexy_software_babe

1. Somehow. Don't ask me, I don't know either.
2. All the popular websites steal from each other, Reddit is just my preferred site for browsing stolen content.
3. Apparently, out of the 30,000 boxes produced, only a dozen or so people were surprised by receiving literal bull feces.
4. As far as I'm aware, the hole-digging project didn't do any serious environmental damage, but you can never be too sure.
5. Depends on who you ask.
6. Alabama, Arizona, Arkansas, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, West Virginia, Wisconsin, and Wyoming.
7. This was when I lost my last bit of hope for humanity.

NOT SHABBAT

OBSERVING NOT SHABBAT AS SOMEONE THAT IS NOT JEWISH

Last term, a friend of mine told me that she started observing Shabbat on Saturdays. As I understand it, Saturday is the Jewish day of rest, in which observers refrain from doing work. Work can be defined to varying degrees of strictness — some may put aside their school- or job-related work, while others may refrain from using their phones or opening doors.[1]

My friend opted to stop doing math and using her phone, though she made an exception when she texted me asking to walk through a trail with her. It was a very sunny day, and we picked apples from branches and sat beneath the shade of a tree.

As an experiment in time management, I've decided to observe the Jewish day of rest this term, at least for as long as is feasible. My only (very arbitrary and self-imposed) restriction is that I'm no longer allowed to do school work on Saturdays — I don't think I'm strong-willed enough to put my phone down or avoid closed doors. It went well the first few weeks: I've gone on walks around town and read books I've been meaning to read and spent much-needed time lying in bed. And it also went well this past weekend: I played piano and drums on campus and walked through the park to get groceries uptown. But I'm now in a position where all five of my courses have assignments due this week, and I'm down a day of critical work. I'm generally pretty on top of my assignments, even at my most overwhelmed, but this is the first time in a while I'm genuinely unsure if I'll get everything done on time.

I was considering doing work this past Saturday as I rolled out of bed, but I eventually resolved not to, and the itch to do work disappeared. I felt very peaceful on Saturday. I felt in touch with the part of myself that exists outside of my identity as a student — a part of myself that simply exists as a being in the physical world, free from obligation. It felt great feeling like there was nothing that needed to be done, at least not on Saturday.

On the other hand, it feels as if I've offloaded the hellish work I'd potentially be doing on Saturdays to the six other days of the week. Sometimes, this feels like a sacrifice I'm willing to make — six days of focused, intense work for one day of great rest. But in a week like this, I wonder if this is really the best way to live.

It's a larger pattern I've noticed in my life: I tend to work on one thing very intensely for a short period of time until I burn out and immediately start intense work on the next thing. Then I get burnt out from that. Winter was a gruelling school term for me, so I decided to take less courses over the summer. But I started working on a hobby project, and that began consuming all of my time and energy. Before I knew it, I was burnt out from that (who the hell gets burnt out from a hobby?). And now I'm back in school, which I missed while I was burnt out from that other thing, and which is now starting to remind me of how gruelling it can be. Term to gruelling term, week to hellish week. Is this really how I must live? Is there no regularity in this life for me?

Or maybe observing the Jewish day of rest *is* regularity. Maybe the week is the most regular length of time, and maybe that's how life just is.

If I make it through this week, I'll try to continue taking Saturdays off. I may even continue if I don't make it. No promises, though.

χ

1. This is what I was told, but it's subject to being completely wrong. Please look into this!

OOPS, ALL JEWISH! A REVIEW OF THE BOOKS I READ DURING TERM BREAK (PART TWO)

You know, I was worried that I'd get a better article idea this issue and then get bored of reviewing the books I've read, but alas I did get a bit bored of this but I didn't have a better idea, so let's get into it.

"YENTL'S REVENGE: THE NEXT WAVE OF JEWISH FEMINISM", EDITED BY RABBI DANYA RUTTENBERG

I saw this book on the shelf and immediately recognized the "author's" name and went "I have to read that". Well, the book wasn't actually *written* by her. It is an anthology of essays about, as you might be able to guess from the title, Jewish feminism. It was an interesting read, but it doesn't… have book vibes. Despite the fact that I have almost exclusively read non-fiction books since grade 8, I still prefer my non-fiction to have a narrative. A collection of essays in book form just doesn't do it for me. It was cool! It contained a lot of perspective from various very diverse backgrounds, some of which resonated with me and some of which I disagreed with vehemently, and I found it really interesting, but I would've enjoyed reading them sooooo much better as a series of Substack articles.

"ATOMS IN THE FAMILY: MY LIFE WITH ENRICO FERMI", BY LAURA FERMI

Another book that isn't *quiiite* Jewish. We all know Enrico Fermi, yes? I don't need to explain this to the **mathNEWS** readership? The nuke guy? Okay. This book is a biography of Enrico Fermi, written by his wife, Laura, who was Jewish. The Fermi family was from Italy, and they immigrated to America due Italy's implementation of antisemitic laws. And then he did a bunch of cool nuclear stuff in America during World War 2! So you know overall the Jewish part was somewhat important.

I really enjoyed reading a biography of a scientist that not only talked about the science that he did, but also his actual life, and the circumstances that led up to his great scientific discoveries. In fact, the author had a pretty limited understanding of the science part. It was very interesting to read a biography from someone who went through all the things they're writing about, *with* the person that they are writing about. It read almost like an autobiography, a first-person account, except it was about someone else. Very interesting, I would love to read something like that again.

FOOTNOTE

I realized that in my last article, I put an asterisk after 296, and then because I never finished the article, I just never clarified that. Under the Dewey Decimal System, which is the most widespread library cataloguing system, especially in public libraries (many large academic institutions will use Library of Congress Classification — Waterloo does), Class 200 [200–300] is Religion. Under that, the 200s and 210s are general things like just "religion" and philosophy of religion.

220s is the Bible, and usually only from a Christian lens (there is a lot of debate on what to number Jewish texts about the Tanakh, actually). 230s is just Christianity. Now that we're done with Christianity, you might guess that we're moving on to another religion, right? Wrong! 240s is Christian practice and observance, 250s is Christian Orders and local church, 260s is social and ecclesiastical theology (still Christian), 270s is Christian history and 280s is Christian denominations (I don't really get the difference between this and Christian Orders tbh and I couldn't be bothered to google it as I write this article). And Every Single Other Religion gets the 290s! Woo! And under that, 296 is Judaism. And many times random books about Jewish people that are not even about religion will get classes under there. It's weird. Also, there are yeshivas and whatnot where the entire library is all just 296. At this point they might as well just use their own library classification system for Jewish stuff. Actually, I wonder how they sort books in Hebrew… hmm, next article idea?

RapidEyeMovement

C2C CONFERENCE

Attention, all UWaterloo undergrads! We would like to introduce you to an exciting conference opportunity, Combining Two Cultures (C2C). C2C welcomes interdisciplinary students from across Ontario and beyond. This year, our theme is "Jack of All Trades", which emphasizes the versatility and adaptability that interdisciplinary education fosters. The conference is being hosted by the Knowledge Integration (KI) students here at UW and will tentatively run from January 12–14. Join us to take part in networking opportunities, unique guest lectures, workshops, and socials, with like-minded individuals. To stay updated, please follow our Instagram @combining2cultures and scan this QR code to receive further updates.

Combining Two Cultures

MATH CND

A RAKUGO ATTEMPT

There are many beloved locations on campus. Ones that are fun to be in, ones that look pretty, ones that sell food. And of the ones that sell food, none is more beloved than the Math CnD, located on the 3rd floor of MC.

And as such two students, Alice and Bob, are walking on their way to CnD, talking about homework. They walk past RCH. Alice starts:

"I can't quite get Q2 to work."

"This is for category theory?"

"Yeah."

"What is it even about?"

"Well I can't get the bijection for the Hom Se—"

"Bijection for YOUR MOM!"

"Okay, that's enough of that. You said you were struggling with a Q5?"

"Yeah, I'm trying to find an injective continuous map."

"Won't the identity do?"

"Is that injective?"

"Well, it's bijective, so that means it's inj—"

"Wait, did you just say bijective?"

"Oh no…"

"Bijection for YOUR MOM!"

"I hate you."

They pass the biology building.

"You can't just say 'your mom' every time you hear a trigger word."

"Who says I can't?"

"If you're going to do it, at least tell me you know what it is."

"What what is?"

"A bijection."

"Bijection for YOUR MOM!!!"

They walk into MC.

"So use it to prove the number of times I've said bijection—"

"your mom~"

"—is the same as the number of times you've said 'your mom'."

"Well for both sets, there must be a well defined function with a well defined inverse."

"In other words?"

They reach the third floor.

"In other words, it's injective and surjective."

"So it's a bijection."

"BIJECTION FOR Y—"

They stop. The doors are shut, the lights are off, there is no one inside, CnD is closed. And then they both remember.

It's a Saturday.

別

PYTHON NEWS: TYPE NOW DOES A FIFTH THING

This prod night also happens to be the release date of a brand new Python version: Python 3.12. New versions of Python aren't always that exciting, but this one has a new keyword! Well, sort of.

The new keyword is `type`. Python has been slowly adding static typing syntax for several years now, and this release adds a ton of new typing stuff, but we're just focusing on the `type` keyword for now. `type` is a bit of syntax sugar for declaring the types of type aliases, essentially.

Type aliases have been a thing since Python started adding the typing stuff, and they originally looked something like this:

```
from typing import Tuple
Point = Tuple[int, int]
# now instead of declaring things as type Tuple[
↪int, int], I can just
origin: Point = (0, 0)
```

because types were just objects, and they didn't do much until you ran the type checker. You didn't declare a type for the type alias, because the type checker would just try to figure out what was a type alias and react accordingly. Then the Python people decided that actually, specifying what is a type alias specifically is a good idea for several reasons, so they added the `TypeAlias` type. Now, type aliases are still objects, but you can annotate them with a type of their own:

```
from typing import TypeAlias
# this is a newer version of Python, so I don't
↪have to import Tuple anymore
Point: TypeAlias = tuple[int, int]
origin: Point = (0, 0)
```

And now, in Python 3.12, they've decided that that's too clunky actually and they can think of a better syntax. Behold, `type`:

```
# I don't have to import anything anymore
type Point = tuple[int, int]
# I can also declare generic types with this
↪syntax (before, I would have to instantiate a
↪TypeVar and it would be ugly)
type Pair[T] = tuple[T, T]
```

This is really cool actually! It'll make programs that use type annotations much prettier and easier to read.

What's the "sort of" then? Well, first off, `type` wasn't added as a normal keyword, but rather a "soft keyword"—meaning it would function as a keyword in that one context, and as an identifier everywhere else.

They've done this before—`async` was done the same way, in order to avoid breaking existing code that used variables or functions called `async`. `async` was eventually turned into a real keyword a few versions later, however, since not many people were naming their variables `async`. `type`, however, will never

be turned into a real keyword, because not only is it a built-in object, it's a built-in object that already does 4 things.

What things? Let me show you.

GET THE TYPE OF AN OBJECT

Wouldn't it be nice to have a function that tells you what type an object is? Well, there is one, and it's probably been in the language since version 1 or whatever. It's called, fittingly, `type`.

```
>>> type("hello")
<class 'str'>
```

Cool! Let's see what else we can do with `type`.

IT'S THE TYPE OF ALL TYPES

Out of curiosity, what would happen if we got the type of that type we just got? Let's see:

```
>>> type(type("hello"))
<class 'type'>
```

Ah! It's `type`. Well, that's understandable. I mean, what else would you call it?

Of course, `type` is itself a type:

```
>>> type(type(type("hello")))
<class 'type'>
>>> type(type)
<class 'type'>
```

ALSO, YOU CAN CONSTRUCT TYPES WITH `type`

Okay, so now that we know that `type` is a type, and type names are often also the names of constructors, does this mean we can construct a type with `type`? Of course we can, because the header I just wrote says so. Normally you would define a class to do this, but I suppose it's sometimes useful to have a way to do it programmatically.

By the way, what's the difference between a type and a class? Nothing. Absolutely nothing. There used to be a difference back in Python 1.x, but now there isn't. Just wanted to make that clear.[1]

So what arguments does the `type` constructor take? Just three: the name of the class as a string, a tuple of base classes for the new class to subclass, and a dictionary of static attributes.

```
>>> Article = type("Article", (),
↪{"max_length": 1000})
>>> a = Article()
>>> a.max_length
1000
```

So `type` does something entirely different depending on whether you call it with 1 or 3 arguments. Just a reminder that Python doesn't have function signatures and you can only have one definition per function name, so these are the same function. Also, since `type` is a class and can be subclassed and the type-getting functionality is technically part of the constructor of `type`, if you subclass `type` (which is a thing that you would want to do sometimes) that subclass's constructor still has the type-getting functionality:

```
>>> class CoolMetaclass(type):
...     pass
...
>>> CoolMetaclass("hi")
<class 'str'>
```

That is, until they prevented this from happening in 3.6 because *what the fuck*.

ALSO, IT CAN BE TYPE-PARAMETERIZED TO ANNOTATE SUBTYPES

So when they first started adding static typing features to Python, you had to import these type annotations from the `typing` module in order to specify type parameters — e.g. you could annotate a variable with the builtin type `list`, but if you wanted to specify a type for the items in the list, you would have to import `List` from `typing` and write `List[int]` or something. Then they decided this was clunky and these typing features were catching on enough for them to add type parameters to the built-in types themselves, like `list[int]`.

At the same time, they helpfully added a type parameter to `type`! For example, `type[BaseClass]` would be the type of `BaseClass` itself as well as its derived classes:

```
>>> class BaseClass:
...     pass
...
>>> class DerivedClass(BaseClass):
...     pass
...
>>> def class_instantiator(cls: type[BaseClass])
↳:
...     return cls()
...
>>> class_instantiator(BaseClass)
<__main__.BaseClass object at_
↳0x000001A168C420D0>
>>> class_instantiator(DerivedClass)
<__main__.DerivedClass object at_
↳0x000001A168C42010>
```

CONCLUSION

in conclusion, `type type = type(type("type", (type(type),), {"type": type(type(type[type]))}))`. Figure that one out.

__init__

1. I'm using "type" and "class" interchangeably, and will continue to do so and confuse you all, because Python does as well. For example, `type(obj)` and `obj.__class__` do the same thing.

A MILD STUDY IN THE CS STUDENT

Hello,

I am not a math or CS student. Thus I have the unique potential to offer an outside perspective on the psychological and biological nature of the CS student based on primary research from the University of Waterloo. Before getting into my study, I would like to make two specific notes. This first article contains particular observations that I have made of an extremely narrow subset of the CS faculty. Furthermore, I humbly ask that you read the rest of this article in the voice of David Attenborough.

The CS student is allergic to the sun and easily overpowered by the slightest change in nature. His immune system is easily destroyed by the slightest change in temperature, thus creating aggressive hatred towards warmth in general.

The CS student has a limited joke vocabulary, and will often get stuck on a certain word or phrase that he finds funny. This could range from the use of a singular word like "Joe" or be broader and more complex depending on the level of evolution that the particular member is from. Moreover, this joke vocabulary will result in an often time perplexing but amusing sense of humour, helping him to create bonds within the species.

The CS student will often be targeted by other similar species of the same genus, and this will be communicated by words such as "deranged, weird, sociopathic and schizophrenic." However, the CS student should never be underestimated, because on the inside, hidden underneath a deep love for C++ and a deep hate for Java, is true charisma, uniqueness, nerve and talent. He is a good and loyal friend, who is most entertaining, but easily destroyed in 1v1 combat, thus making him only slightly threatening.

Science has made great leaps and bounds over the last century. Who knows what more we will uncover about the CS student? Until next time on Planet University of Waterloo…

Politics Panda

MATHNEWS

FASS PRESENTS: WATERLOO'S NEW FACULTY, AND I GO WATCH

THEY TURNED PD INTO A FACULTY, FUNNIEST SHIT I'VE EVER SEEN

I was recently informed under mysterious circumstances that the Faculty, Alumni, Staff and Students (FASS) Theatre Company of UW was organizing a brand new show — Waterloo's New Faculty, a look into an alternate timeline where they finally commit fully to the bit and make PD its own faculty, complete with its own major, professors, and stereotypes across campus. As a big PD enjoyer myself, and having heard great things about FASS, I was looking forward to the show! Here's how I thought it went.

EXCITING BEGINNINGS

The show started off with some sort of a song-and-dance that the audience was supposed to take part in, and I was later informed that I was supposed to know the lyrics from cultural context. Oops, international student moment.

The first scene, "PD Goes Rogue", described the eureka moment that led to the (frankly brilliant) idea of PD becoming its own faculty. As tradition with everything we dread about the modern co-op experience, this scene takes nearly entirely over the course of a Zoom meeting[1], wherein the process of taking feedback from an employer about Waterloo's co-op students, people in CEE realize that PD has been a failure, and they do what CEE always does when they realize PD is a failure — double down! Through a mixture of bribery and political favour, the PD professor convinces everyone to help him start the Faculty of Professional Development that offers the major, Bachelor of Becoming An In-Person Person.

This scene was great. The jokes landed exceptionally well, I could comprehend everything that was going on, and I was looking forward to how these characters developed and new ones were introduced.

SORRY, WHAT? (THE INAUDIBILITY KIND)

Starting from the second scene, "Orientation Week", things started to go downhill. I'll be talking less in detail about the contents of this and future scenes, mostly because *I couldn't hear the characters.* 😩 The scene follows two first-year Becoming An In-Person Person (henceforth referred to as BAIPP) majors, as they show up to orientation week with high hopes, only to be shunned by everyone — either because people didn't know that a PD faculty existed, or because they knew it existed and didn't want to associate with anyone from it.

At one point, the pair breaks into song, and I have no idea what the lyrics were because I couldn't understand what either of them were singing, between them being drowned out by the (admittedly excellent) band, and the song requiring them to say the words in a way that was hard to understand if you didn't already know what words to expect. Maybe having lyrics to the song in the provided programme would help?

SORRY, WHAT? (THE DISBELIEF KIND)

The third, fourth and final scenes ("Am I Real?", "Advanced Handshakes", and "Stretch Your Mind" respectively) follow the same beat, and also get increasingly hard to comprehend.

When I could understand them, though, it didn't get much better… I was hoping there would be some sort of character development, where the downtrodden BAIPP majors would somehow rise up against Big Engineering or cause a cultural shift, or realize that the whole faculty was a sham and ninja themselves into another faculty without the staff noticing, or *anything else.* But the scenes both pretty much just involved the BAIPP majors being the butt of jokes, and being too stupid to do anything about it.

I guess there were digs at other parts of the university too, but only in the sense of showing power structures oppressing students, which also didn't make sense because they were pretty much only oppressing the BAIPP majors? Am I supposed to relate to them, or am I supposed to laugh at them? I was honestly quite confused.

THE GOOD STUFF

The music for the show was mostly done by 99BPM, FASS's in-house band. And they were *glorious.* If I had enjoyed nothing else in this show (and to be fair, I did enjoy a fair bit of it), all my time spent in this lecture hall on a late weekend evening would have been worth it just to listen to 99BPM. They went *so much harder* than they had any right to, and I was constantly humming along or tapping my heels at songs I hadn't ever heard before. Loved them.

Also, there were two "featured acts" in the middle of the play, from the UW Improv Club and the Warriors Band. They were also both amazing — Improv had me giggling from start to finish at their short outtakes on zombie romance, and Warriors Band brought the same amount of cheer and enjoyment in their music as 99BPM brought mood and aesthetic.

Also, shoutout to that one guy who had to keep running back and forth between 99BPM and Warriors Band because they were part of both. I would get your autograph if I could.

THAT SURE WAS AN IN-PERSON EXPERIENCE

I think I'm being a bit hard on FASS. The show was, honestly, quite good overall, and the amount of effort that clearly went into the characters, the props, the music, and the effects was so incredibly clear. It probably takes a Herculean amount of work to whip up something this complete and enjoyable in — sorry, what did that guy at the beginning of the show say?

Two weeks? **They did this in two weeks?!** I respect and salute all the performers, I can barely do my laundry that often.

I just wish the lack of a narrative across scenes and my inability to hear anyone, especially in the later scenes, didn't get in the way of my enjoyment as much as it did. I honestly find it hilarious that the bit that was easiest to understand was the Zoom call… oh well.

Next time they host a play, I'll definitely go again, but maybe I'll try to sit in the front row.

tendstofortytwo

1. Should've done Microsoft Teams for the true UW experience.

WHAT'S SO GOOD ABOUT PRO-LIFE

Recently, I've heard outcry over the pro-life club here at UWaterloo. That they should not be allowed to run. It's quite the opposite.

It's grounding to hear these orthogonal ideologies exist. It shows a certain level of free thought to so boldly go against popular opinion.[1,2]

The independent student newspaper of UPenn[3] headlines by reproaching the guest lecture of a white nationalist at the school. It's not just Waterloo.

No opinion should be banned. University is supposed to be a place where ideas are expressed freely. Good and bad ideas naturally sort themselves through the sediment. I don't see hundreds rushing to join the pro-life club at Waterloo. Sounds like the people have spoken.
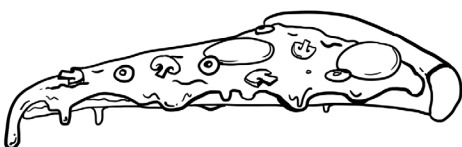
Should we restrict free speech because theirs is deemed bad?

What constitutes bad?

The real danger on campus is not the pro-life club, but those who censor and restrict free thought.

CommonDiyar

1. Popular opinion relative to the University of Waterloo.
2. Interestingly enough, all novel ideas are inherently a little crazy at first. Not that I support this one.
3. Vol. CXXXIX: White nationalist scheduled to speak at Penn Carey Law class taught by Amy Wax

IN RESPONSE TO "WHAT'S SO GOOD ABOUT PRO-LIFE"

"What constitutes bad?" Are you serious? This isn't a grey area. There are those who advocate to force people—second-guessing, poor, underage, raped—to give birth; to turn a blind eye to the statistically-supported lower quality of life for these unwilling parents and these children forcefully brought to term; to put their religion over the lives of anyone else; and there are those who don't. There are people who are OK with hurting people in the name of their beliefs, and people who aren't.

But, as you say, good and bad ideas clearly sort themselves through the sediment. They're sorting themselves out for trans people in Florida right now, right? They sorted themselves out for dissidents in the Middle East. They sorted themselves out in the Beer Hall Putsch and the trial that followed. Glad we're not dealing with anti-Semitism and all that stuff anymore, right? But who knows, maybe it's not so bad? It's hard to tell. Marketplace of ideas and all. It's a pretty grey area. Everything's so grey. Why don't we afford white nationalists a club? How about Nazis? It's just freedom of expression after all. They're free thinkers, going against the grain. It's just a civil exchange of ideas!

"Well, while I don't agree with your conclusion, I'm just glad we could have a rational discussion about this like civil people. It's a hallmark of a healthy and open-minded society." You and your partner in debate shake hands, he trains his weapon on your head, and you accept his fatal blow. It's a good thing you talked it through.

No. I'm tired of hearing this "free marketplace of ideas" bullshit. I'm tired of people who aren't willing to engage or commit spending all their time equivocating between good and evil. People are free to hold and express their opinion under the rights afforded to them by the government, but they are *not* free to be given a platform under our community. If they are given space, they will destroy us. We *cannot* tolerate regressive ideas like forced birth, and it must be fought and shut out of our community by whatever tools we have. What it takes is to turn these ideas away at the door with a firm "no", and to refuse them a platform outright. To do anything less is to be complicit with hate and violence.

jeff

ANCHOVIES

Thank you, prod night-goers, for voting for my roasted garlic/sun-dried olives/anchovies pizza. It was delicious, and I'm proud of you for leaving no slices of it uneaten at the end of the night. You've made me a very happy editor.

distractED

prof**QUOTES**

CS 246E: BRAD LUSHMAN

❝ We're thieves, not murderers.

❝ If I am stealing from you it is not enough for me to have it… You must also *not* have it.

❝ Hey, you're about to be pushed off a cliff, and I need your stuff, so you might as well take my stuff with you so I have space.

❝ The best place to learn more — and I can't believe I am saying this — would be in **mathNEWS**.

❝ A few years ago an individual wrote a series of articles on C++ in **mathNEWS**… *[Editor's note: who]*

❝ "Friendship is one of the cutest things in C++, but I suspect I will still find a way to make it dark." *[Later in the lecture, he accidentally hits a light switch and turns it off]* Student: "I guess things did get dark."

CS 245E: SHAI BEN-DAVID

❝ I will definitely have written the course notes by this weekend, if not then you can shoot me next week.

SE 101: PAUL WARD

❝ Because there is a finite amount of time there is a finite amount of things that we can do.

❝ If you're in the Soviet Union, umbrellas are useful to stick a poison tip on the end so you can go around stabbing people. THAT would be a useful use-case for an umbrella.

❝ Your life is worth a dollar.
Let's all have a moment of existential dread.

❝ Nobody liked my idea of chopping two fingers off babies so we would use base 8.

❝ Sorry, my brain has gone completely dead.

❝ Hush, kiddies.

❝ Software engineering is the product of an illicit relationship between ECE and CS.

❝ Four words: you are going to lose the copyright case.

MATH 117: ELANA KALASHNIKOV

❝ We have four days before midterms and we will cover ALL of derivatives.

❝ You can plug this into a calculator, or you can just think about the numbers.

❝ Despite this being intuitive, it's actually not completely trivial to prove.

❝ Numbers come in three different flavours.

❝ Talk to your friend next to you. Or your neighbour if they're not your friend.

❝ We have an extra class today — what fun.

MATH 135: NICO SPRONK

❝ And the discovery: Absolute value is annoying.

❝ Something went wrong here… Oh! I'm an idiot.

❝ I demanded little of myself, so that's what I offered.

❝ I think my brain completely leaked out of my sinuses last night.

❝ I think my problem is that I'm lazy and didn't care.

❝ So if I explain this to my pothead roommate.

❝ How many horses are there in Mongolia?

CS 137: VICTORIA SAHKNINI

❝ Write down your solution, for God's sake.

❝ …You think thinking is a waste of time.

❝ Logic hurts.

❝ We don't want to make my husband happy for a second weekend.

❝ Any problem you solve using loops, you can solve using recursion. *Clearly*.

MATH 115: RUIKUN ZHOU

❝ *(Student: "Do you think $\mathbb{R}^2$ is a subset of $\mathbb{R}^3$?")* Do *you* think $\mathbb{R}^2$ is a subset of $\mathbb{R}^3$?

❝ If you were born 300 years ago, how would you define the addition of vectors?

❝ Just learn dot product and you can at least get the marks for one question.

❝ I will just skip all the definitions.

❝ It is not unique but it is unique… It is not unique but it is unique.

❝ Note that a trivial solution does not mean that it's trivial.

ECE 105: MATTHEW ROBBINS

❝ Donkey Kong… well, you know Donkey Kong, he's just a jerk.

❝ What can I throw which I wouldn't get in trouble for…

❝ There are a lot of ways I can make people mad at me.

❝ *[Flings mic across room]* Well, that's fine! I found the maximum speed though.

CO 330: OLYA MANDELSHTAM

❝ It's actually not exactly that, but it's something close. Yeah, I don't remember what it is so *[replaces = with ≈]* it's something like that.

CO 450: WILLIAM COOK

❝ Geese can remember you. You never want to go back to the same one twice.

❝ You guys are healthy. I teach a low-level course. Those people are sick all the time.

CO 456: MARTIN PEI

❝ I have not been to prison so I have no idea… not yet.

CO 485: DAVID JAO

❝ In cryptography, we don't really know when problems are open—we can't really prove things anyways.

❝ Elgamel is IND-CCA1 assuming Elgamel is IND-CCA1.

❝ To get to the next level, you're going to need someone even more BOSS than Euler. That would be Gauss.

❝ What's the emoji for "sort of"? I think it's like the Japanese tsu… *[writes ¯_(ツ)_/¯]*

CS 145: GORDON CORMACK

❝ Anyone reasonably skilled in programming can go from here [representation of an idea] to there [implementation in code], but obviously that excludes me.

❝ Instead of me writing some incorrect code on the board, I'll write some incorrect code in Dr. Racket.

❝ Oh oh oh yeah, yeah, I fucked up.

CS 251: STEPHAN MANN

❝ Pedestrians? Run them over!

CS 341: RAFAEL OLIVEIRA

❝ After CS 240, did you just go to UofT to get an easy degree? No, you decided to continue and deal with me.

CS 341: TREVOR BROWN

❝ I don't want to mark that hot garbage.

❝ So a rational knapsack is appropriate when you're robbing a bulk barn. 0/1 knapsack is for when you're burglarizing a Best Buy.

CS 350: KEVIN LANCTOT

❝ It was Google that did this. No, it's Alphabet. I don't know what they're called anymore.

ENGL 109: CLIVE FORRESTER

❝ Ugly people get married too.

❝ I've seen lots of ugly people get married.

MATH 135: SHANE BAUMAN

❝ If you have a domino chain and it ends after 2 dominoes, no one will watch it except your mom.

❝ We're civilized people. We're not engineers.

MATH 145: JASON BELL

❝ Notice that… I was gonna say there was something to notice, but there's nothing to be noticed.

❝ You might ask me, "Hey Jason, how would I see Pascal's Identity here?" Well, you just have to!

❝ Maybe one day if I have 2 minutes left in class I'll prove this for you. *[Points to AM-GM inequality]*

❝ We have once again broken mathematics!

❝ We're stealing from Euclid but he'll see this *[points to modified equation]* and say "that's pretty cool, you get a pass".

❝ We have a few minutes left. Urgh, I can't help falling into that meme. (https://www.reddit.com/r/uwaterloo/comments/16qcly9/math145/).

❝ We're stealing from Euclid, but it's fine because he's dead.

❝ Jason is a thief! It's okay, Mathematics: I can be a thief.

❝ Do you all understand that? I'm not sure that I understand that!

> Oh wait, for you all taking MATH 147, you'll like this: *[writes $\epsilon > 0$, class cheers]*

> I don't know how to do long division, you'll have to help me.

> I'm surprised we can finish this in time, but I did go really fast and confuse a lot of people. But this did make sense right? If it didn't, go home and make it make sense.

> Okay, we have 3 minutes left; time to go into speed mode. *[Proceeds to write 3 more boards of math]*

> So we have around 32 seconds left, I guess that means I'll prove something for you. *[Starts writing faster]*

> I just like strong induction. WHAT'S WRONG WITH THAT?!? You can't judge me for liking strong induction.

MATH 145: JERRY WANG

> I don't know what $1 + 1$ is.

> I am a field.

> Countable — I assume you know what this means from elementary school.

MATH 245: STEPHEN NEW

> I won't ask you something like this on a midterm, but should you know this? Well yeah, you should know everything.

PMATH 945: JASON BELL

> I think I cannot go off-script anymore because I don't know what I'm talking about.

CO 673/CS 794: STEPHEN VAVASIS

> If you're a cross country skier… I'm more of a cross-country faller.

CS 484/CS 684: YURI BOYKOV

> *[On the topic of homographies]* They can send you to hell in different directions.

ATTENTION!

THIS IS AN IMPORTANT ANNOUNCEMENT!

:3

Thank you for your attention.

boldblazer

WHY DOES EVERYONE LOVE METAMORPHIC PETROLOGISTS?

Because they are so Gneiss <3

rockfacts

SOME DOODLES

alyssnya

DICK SMITHERS, GYM BRO
BASED ON A TRUE STORY

On my way to campus, right outside PAS, I saw Dick Smithers walking by. This was odd, since it was 8AM, and Dick was walking south, away from campus. I called out to him and said,

"Hey Dick, where on Earth could you be coming from? It's, like, 8? In the morning?"

He turned towards me and smiled.

"Oh, I was just coming back from the gym."

His muscles rippled.

"You know, as much as I wanted to, I just couldn't skip leg day."

He chuckled.

His bicep tensed the slightest bit, and his sleeve was ripped to shreds, scattered across Ring Road. The threads danced in the air like snowflakes.

"It's important to always have a routine. Walking into the gym without a plan made in advance is a mistake I stopped making only recently."

He flexed his core ever so slightly and the shockwave almost knocked me off my feet. My ears rang.

"It's crucial to warm up before getting into your routine. It greatly reduces injury risk, you know. Here, let me show you a stretch I recently discovered. It does wonders for my lower back."

"Dick, No!" I began to shout, but it was too late. My vision went grey. It felt like my lungs burst. I was thrown a good five feet into the air. I was lucky to have my fall broken. Not so lucky were the mother and small child who broke my fall. I struggled to get up against the strong winds.

"It's important to remember stretching is just a part of warming up. You can't just stretch and then go in with cold muscles. Your warmup has to be dynamic too."

I felt the Earth tremble. I lost my balance. Rocks and fragments of glass and tree trunks whipped past me. I clung on to a nearby lamppost for dear life as the tempestuous winds roared. The mother and her child were obliterated by a truck sized piece of asphalt launched by the seismic tremors.

"It's Important To Concentrate On Your Form, Now. You Will Have Much Better Results If You Do Exercises With The Correct Form But Lower Intensity Than Vice Versa. Ego Lifting Only Causes Injuries."

I heard the lamppost strain under the force of the inferno now emanating from Dick Smithers. A bolt keeping it secured popped out. Then a second. Then a third. The air burned. Every ounce of my body was screaming out in pain, my arms felt like they were ripping apart, I could hear my joints dislodging. Despite the deafening cacophony as PAS exploded into shrapnel behind me, Dick Smithers' voice somehow retained perfect clarity.

"AND REMEMBER, IT WILL TAKE A WHILE TO SEE RESULTS. THE PROCESS IS THE REWARD. EVERY TIME I GO TO THE GYM, I KNOW THAT I HAVE THE WILLPOWER TO GET THERE EVERY MORNING. THAT IS THE REAL REWARD. THESE MUSCLES ARE JUST A NICE BONUS."

And I could hold on no longer. I was flung backwards into the maelstrom.

"See you around," Dick Smithers said, and then he turned and smithered away.

aphf

EPISODE 61: DOMAIN COLOURING

Enjoy Episode 61 of the MathSoc Cartoons series: PMATH 352 — Domain Colouring!
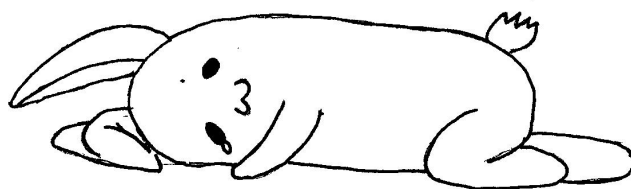
If you are interested in this topic and the graphs on panel 4 of page 2, feel free to check out the work of J.C. Ponce Campuzano (a mathematician living in Australia) at https://www.dynamicmath.xyz/domain-coloring/ and at https://twitter.com/jcponcemath. We worked with him to obtain permission to use the images.

Want to see the next comic BEFORE it's released and provide feedback to help us out? Sign up anytime to be a reviewer at https://bit.ly/mathsoc-cartoons-reviewer-signup!

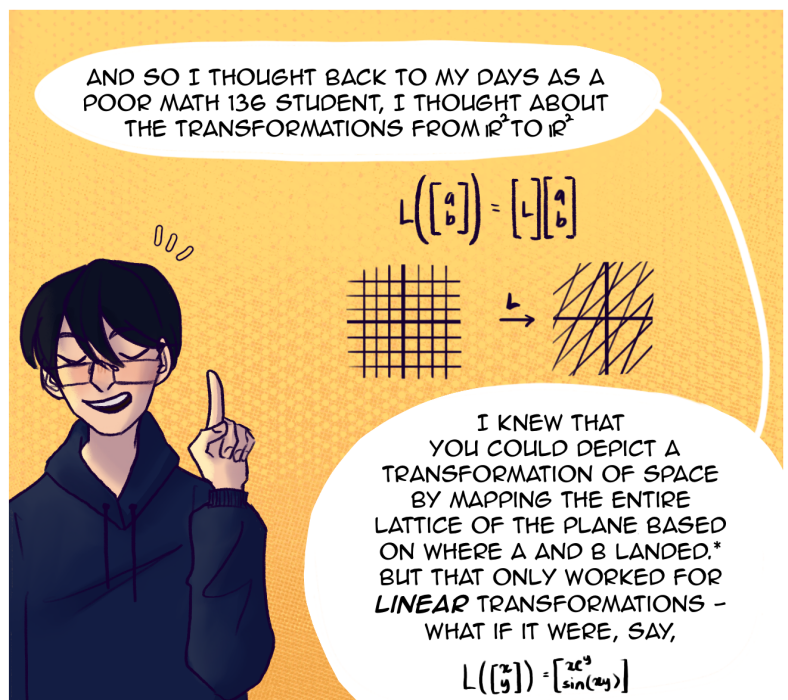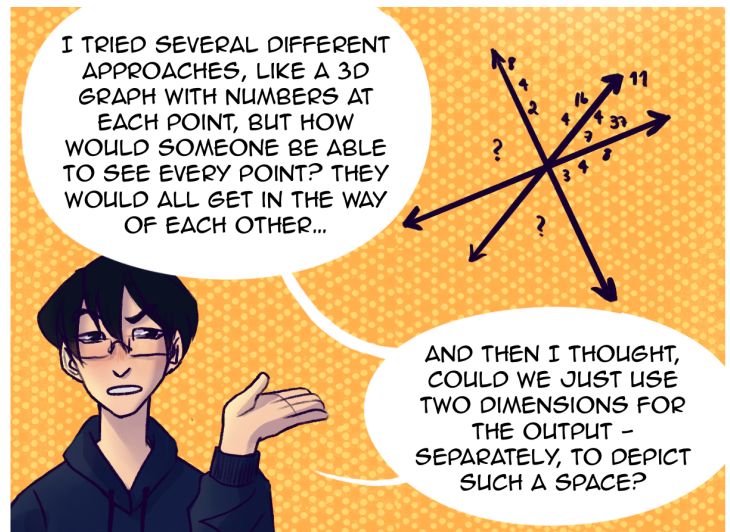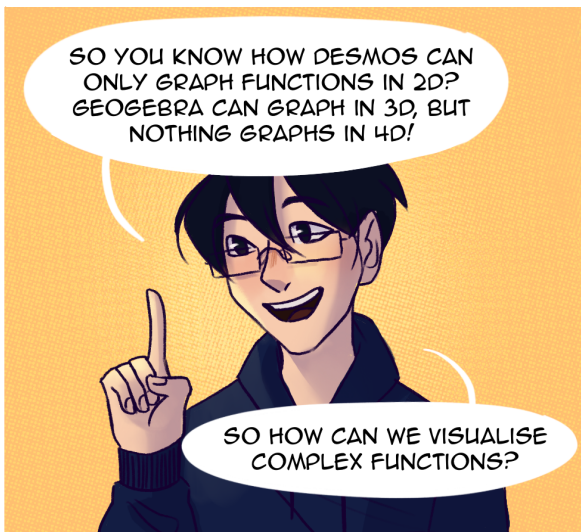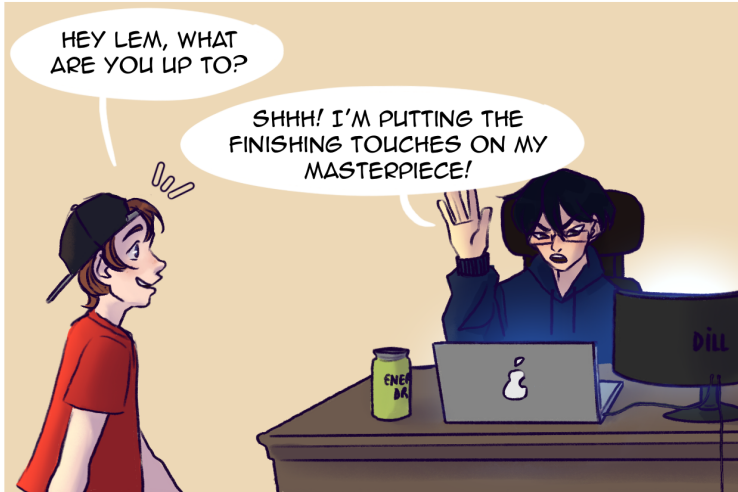Want to see the next comic when it's released? Follow @mathsoccartoons on Instagram and Facebook!

As always, feedback, suggestions, and fan art can be left on the MathSoc Cartoons channel in the MathSoc Discord server or sent to cartoons@mathsoc.uwaterloo.ca.
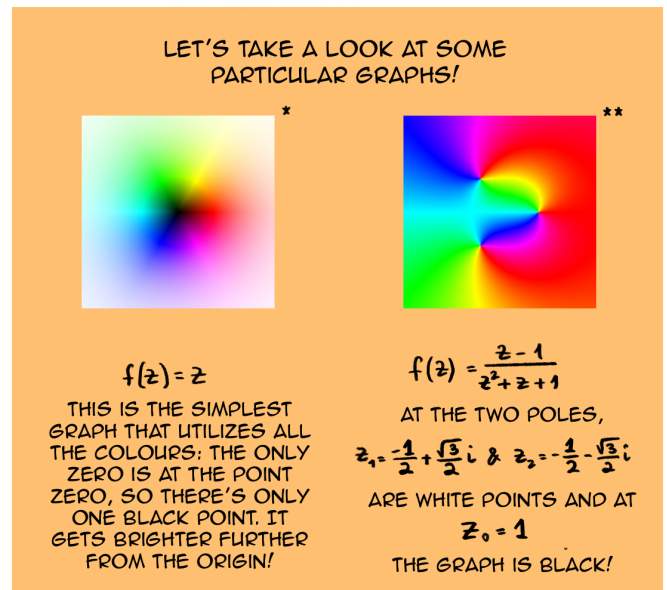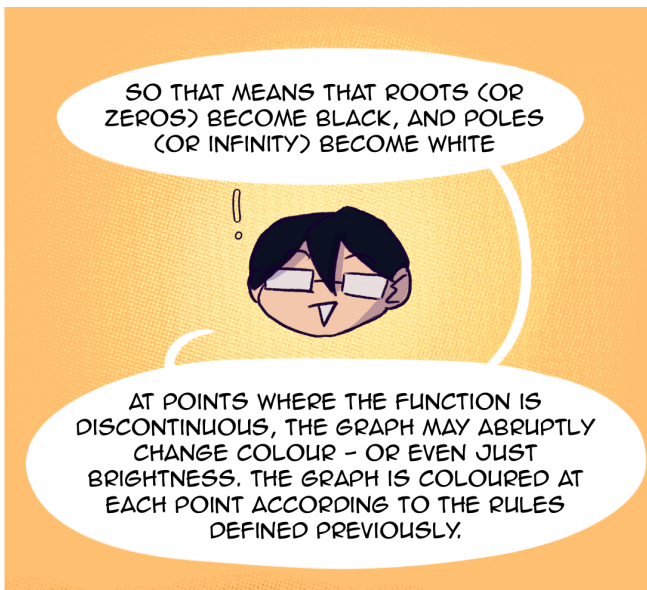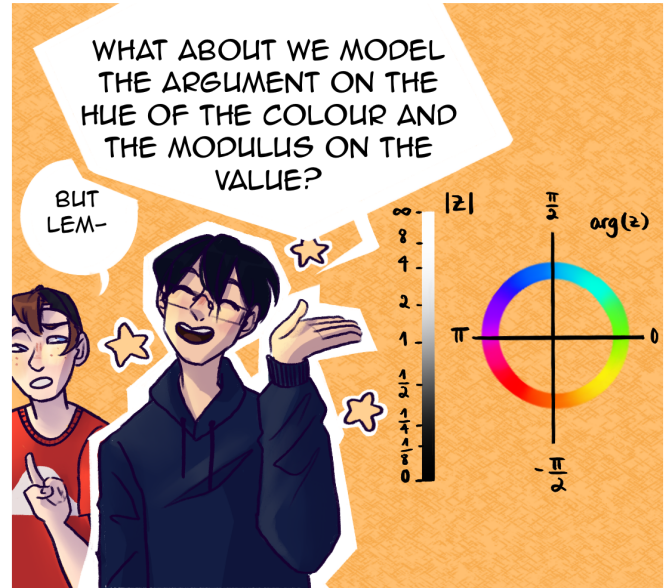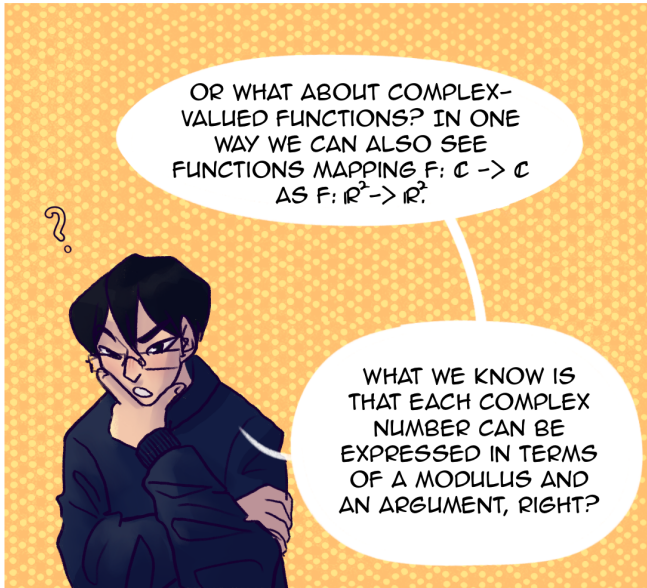
MathSoc Cartoons

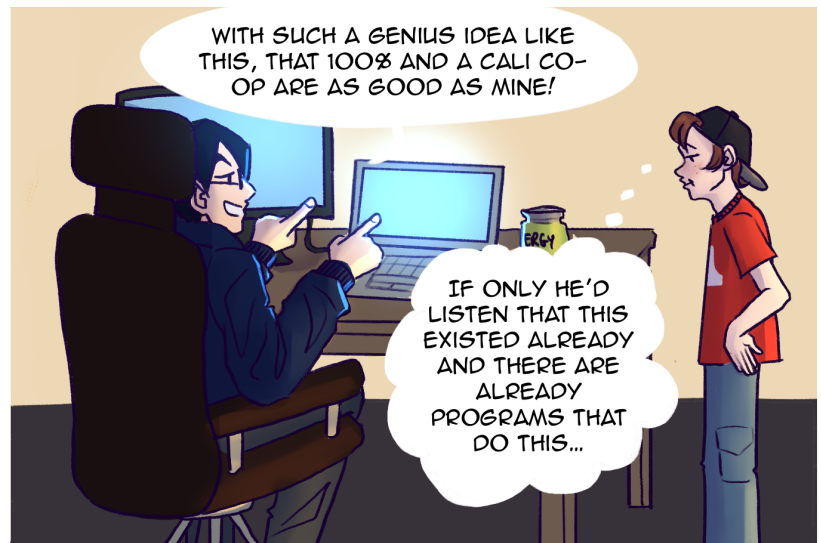## PMATH352 – DOMAIN COLOURING

WRITER: BRYAN CHEN
ARTIST: AICHA GHIDAOUI

OR WHAT ABOUT COMPLEX-VALUED FUNCTIONS? IN ONE WAY WE CAN ALSO SEE FUNCTIONS MAPPING $f: \mathbb{C} \to \mathbb{C}$ AS $f: \mathbb{R}^2 \to \mathbb{R}^2$.

WHAT WE KNOW IS THAT EACH COMPLEX NUMBER CAN BE EXPRESSED IN TERMS OF A MODULUS AND AN ARGUMENT, RIGHT?

WHAT ABOUT WE MODEL THE ARGUMENT ON THE HUE OF THE COLOUR AND THE MODULUS ON THE VALUE?

BUT LEM–

SO THAT MEANS THAT ROOTS (OR ZEROS) BECOME BLACK, AND POLES (OR INFINITY) BECOME WHITE

AT POINTS WHERE THE FUNCTION IS DISCONTINUOUS, THE GRAPH MAY ABRUPTLY CHANGE COLOUR – OR EVEN JUST BRIGHTNESS. THE GRAPH IS COLOURED AT EACH POINT ACCORDING TO THE RULES DEFINED PREVIOUSLY.

LET'S TAKE A LOOK AT SOME PARTICULAR GRAPHS!

$f(z) = z$

THIS IS THE SIMPLEST GRAPH THAT UTILIZES ALL THE COLOURS: THE ONLY ZERO IS AT THE POINT ZERO, SO THERE'S ONLY ONE BLACK POINT. IT GETS BRIGHTER FURTHER FROM THE ORIGIN!

$f(z) = \dfrac{z-1}{z^2+z+1}$

AT THE TWO POLES,

$z_1 = -\dfrac{1}{2} + \dfrac{\sqrt{3}}{2}i$ & $z_2 = -\dfrac{1}{2} - \dfrac{\sqrt{3}}{2}i$

ARE WHITE POINTS AND AT

$z_0 = 1$

THE GRAPH IS BLACK!

* / ** CREDIT: J.C. PONCE CAMPUZANO. HTTPS://WWW.DYNAMICMATH.XYZ/DOMAIN-COLORING/

UMM LEM, I'M PRETTY SURE–

WITH SUCH A GENIUS IDEA LIKE THIS, THAT 100% AND A CALI CO-OP ARE AS GOOD AS MINE!

IF ONLY HE'D LISTEN THAT THIS EXISTED ALREADY AND THERE ARE ALREADY PROGRAMS THAT DO THIS...

MEF
Mathematics Endowment Fund

MATHSOC

ANIME REVIEWS PART 4

I'm sure that these need no introduction by now. There are $< \epsilon$ spoilers.

MY YOUTH ROMANTIC COMEDY IS WRONG, AS I EXPECTED A.K.A. MY TEEN ROMANTIC COMEDY SNAFU A.K.A. OREGAIRU — 8/10

I was diagnosed with Asperger's Syndrome when I was four. This isn't at all related to the show, but I thought it to be worth mentioning because if it weren't the case then somehow I don't think I would have liked it as much as I did.

On its face, *Oregairu* is about a certain loner in high school, whose cynical attitudes about society cause his teacher to make him join a "service club" so that he becomes less antisocial. This leads him – as male audience self-inserts so often are in anime – to be unexpectedly thrust into a friendship with the two girls that make up the club's roster of three. It's not the first anime that goes something like this, and it almost certainly won't be the last, but I think *Oregairu* manages to pull it off in a unique way for several reasons.

One of the biggest ones is that the show is, in spite of its suggestive (and hilariously long) title, not overtly romantic. Almost all of its run time instead focuses on the various aspirations of the protagonists, whether it's figuring out how to navigate social situations, deciding on a career path, taking student council duties a little too seriously, or questioning the nature of their peculiarly-conceived friendship. Another is that the characters are all really substantial and have compelling motivations and backstories, including those who in a lesser show of this sort would be nothing more than a pretty face for the fan-service episodes.

If there's one criticism that I and some others have of this show, it's that the dialogue is, at many times… subtle. Maybe too subtle. There are more moments than I can count when one of the protagonists goes off on some deep-sounding monologue for minutes on end, only for me to pause afterwards and think, "Wait… what just happened? Did I miss an important plot point just then?" It got to the point where after each episode I would go to Wikipedia and read a textual synopsis of what I just saw, to make sure I wasn't missing out on the nuance.

Now, you'd think this would be a pain to do, but I actually think it gave me a deeper appreciation for the central theme of the show. At the risk of sounding like I'm writing a high school English essay, I think there's a sense in which the Hikigaya's long-winded speeches and Yukinoshita's somewhat awkward way of speaking reflect the intellectual, but not intuitive, understanding they have of society and its dynamics; their point of view is that of someone who by virtue of being socially isolated (for one reason or another) has come to build a mental model of social relationships without ever experiencing one in a genuine capacity, which is something that I and probably a lot of others, autism-having or not, can relate to on a personal level. Their journey of slowly overcoming these feelings as they relay their life stories to each other and work together as a club is one that I found really inspiring.

And hey, even if you don't care for any of that sentimental crap, *Oregairu* is hilarious. Trust me — I watch a lot of comedy anime because I like to laugh, and this is easily in the top 3 for that metric. I really liked it, and maybe you will too.

86 — 8/10

86 is a show about war. I'm not much of a military buff, and insofar as I find war to be rather a depressing topic, I was unsure how engaging I would find it. Thankfully, though, my worries were quickly dispelled.

Its story tells of the Republic of San Magnolia, which is deploying its fleet of unmanned machines to combat the AI army known as the "Legion" created by the distant Empire of Giad. The part about them being unmanned, however, is immediately revealed to be a farce — in reality, the Republic is an apartheid state that conscripts its racial underclass, called the "86" because of their relegation to the unofficial 86th district outside of the main 85, as slave soldiers to pilot their war machines.

It's clear that the fictional Republic takes some inspiration from the Axis powers of World War 2, and a few lines of dialogue in particular seem to invoke images of the troubled past of the United States. The show is not primarily about the politics of war, however — this aspect of *86*'s fictional world serves only to set the scene for the brutal reality of life on the frontlines. There are deaths, naturally, but that's not the half of it. There's also verbal abuse, mercy killings, suicide, and the psychological burden that comes with it all.

I found the show's plot to be serviceable, although not extra-ordinary. In fairness, however, the anime only adapts a small fraction of the several light novels on which it is based. The same is true of the cast – they're not bad, but I can't think of anything significant enough to warrant mentioning any of them by name. Normally those two aspects are the biggest influences on my overall impression of an anime, but I found *86* to be somewhat of an exception. If there's one word I would use to describe this anime, it's "beautiful". The show's striking and detailed visuals, incredible soundtrack, and brilliant directing all serve to convey the raw emotion of the battlefield in a way that just about compensates for its relative shortcomings in other areas. Even the sound design, which is something most people hardly ever think of when watching anime, made a noticeable contribution to the futuristic atmosphere of each scene. *86* is, in my opinion, a cinematic experience above all else — and a really good one at that.

At this rate, I may have time for a non-anime article by the end of the term. Maybe.

yalevoylian

XENOBLADE CHRONICLES 2 SPOILER FREE REVIEW

REVIEW

Xenoblade Chronicles 2 is a JRPG set in a world above the clouds. Humans live on massive life forms called Titans that roam around the clouds, but are slowly trudging towards death. The main character, Rex, is on a coming-of-age journey to save humanity from collapse by seeking Elysium — a paradise large and fertile enough to host all of humanity.

Firstly, this game is quite long. I personally took about 80 hours to finish the game, mainly because I did a lot of side-questing and leveling of the characters, and I was not even close to 100%ing the game. The world is massive, with multiple different Titans to explore, multiple secret areas to find, bosses to kill, and side quests to complete. Not only that, but to fully 100% this game, you would have to play New Game+.

The combat system in this game is pretty unique and requires a lot of strategy, though it is quite complicated and poorly explained. The player-controllable characters, known as Drivers, can equip humanoid weapons called Blades that follow you around and attack alongside you. Drivers will automatically make basic attacks when they are near an enemy, which charges a Driver's skills, called Arts. After charging up and casting Arts several times, you can use Specials, which are a Blade's ultimate ability. Not only that, there are multiple elements linked to Specials, such as water, fire, lightning, etc. and you have to trigger your party's Specials in a particular order of elements. This allows for a lot of strategy in which Specials you would like to cast and requires a lot of forward planning. One irk is that even though the combat system is fun, it is extremely poorly explained. I had to watch several videos on YouTube because of how confusing the combat seemed at first, but when you get the grasp of it, the battle system is extremely smooth and fun.

Another critique about the combat is that although some Blades are given through the story, a large majority are obtained through a lottery system. Drivers can roll a Common, Rare, or Legendary Core Crystal to summon Blades, and a large majority of the Blades you get are trashy common Blades, which makes it extremely hard to get a particular Blade you want. In fact, I did not get a particular Blade I wanted even though I rolled hundreds of times throughout my playthrough, which could make it tedious if you do want to 100% the game.

One last critique I have is with the navigation system, and it is one of the worst navigation systems that I have ever seen. I have spent way too much time getting lost in the expansive world, trying to go from one place to another, and the navigation system did not speed it up. You only get an indicator of the general direction you are supposed to go, how far you are from the objective, and whether the objective is above or below you. It does not tell you how to actually get there. There are many times when the indicator is actually misleading as you are supposed to loop around the map or go through a secret area in order to get to the main area objective, which I never would have found if not for watching YouTube guides on where to go.

Now that we got the main critiques out of the way, lets move on to the positive aspects of the game. The story of this game is superb. As in XC1, plot twists and foreshadowing were being thrown out constantly, and you could never predict what was coming next. The story kept me on the edge of my seat the whole time, and I played through the majority of my 80 hours in a week or two, because I just could not put it down.

The main story is of an ancient war, with god-like beings and power struggles, though underneath we have a very human tale of nations in conflict, friendship or isolation from the rest of the world, with a touch of humour added in here and there. The cutscenes are also long, but beautiful. A lot of the cutscenes were about 10+ minutes long, especially the ones at the end and beginning of each of the 10 chapters, which makes it feel like you are playing through an anime. Not only that, when you finish the main game, there is also a 20–30 hour long prequel which is added in as a DLC to add to the already massive lore of the universe.

One main issue with the story is the Nopons. Although they are extremely cute and I do love them a lot, their inherent goofiness takes away some of the seriousness in certain scenes. Not only that, the English voice acting isn't that great as well, as a lot of the characters have very strong British, Scottish or Australian accents. Personally, I played the majority of the game on Japanese dub with English subtitles, which I found a lot better, especially because sometimes the English translation is a bit iffy.

VERDICT

Xenoblade Chronicles 2 is truly a work of art. It is one of my favorite JRPGs due to its intricate combat and immersive storytelling. If you played Xenoblade Chronicles 1 before (which I do highly recommend you play before you play 2), you will love this game as well. Although it has some flaws, none of them (except the navigation system) are major, and are overshadowed by how good this game is overall.

Final Score: 8/10

Fried Rice

GMATH 101: INTRO TO GIRL MATH

PRIMARY AXIOMS OF GIRL MATH

1. WatCard money isn't real money therefore anything I buy with Flex Dollars or my meal plan is free.
2. When you return something or buy something discounted you make money.
3. Cash is not real money.
4. If you work really hard one week, everything you buy will be offset by the paycheck from your hard work.
5. Inflation is making money.
6. You're not spending money, you're investing in yourself.

Q1. Prove Statement A.

Statement A: We made a net profit of $420.51 on the Canada Goose Junction Parka in Pink Lemonade, purchased for $1,350 exactly 4 years ago.

To prove Statement A, we will use Axiom #5 and the Future Value of a Single Payment formula: $FV = PV \cdot (1+i)^n$

FV is Future Value, PV is Present Value, i is the interest rate per compounding period, and n is the number of compounding periods.

If we follow the inflation rate from 2022 released by Statistics Canada, we can assume the average annual inflation rate sits at 6.7983%. Inflation rates are released monthly, therefore we will assume inflation will also be compounded monthly. Because i is the interest rate per compounding period, we must divide by 12 because there are 12 compounding periods per year (compounded monthly). Therefore the interest rate per compounding period (i) will be 0.566527778%.

The present value (PV) will be $1,350, following the original $1,350 we spent. The number of compounding periods (n) is 48 because we purchased the jacket exactly 4 years ago, and interest in this example is compounded monthly, we multiply (4 years)×(12 compounding periods a year) which gives us a total of 48 compounding periods.

Now, when we go back to the formula $FV = PV \cdot (1+i)^n$, we can plug in the numbers. That gives us $FV = 1350 \cdot (1 + 0.566527778\%)^{48}$. If we plug that formula into Excel, the future value (FV) is $1,770.51.

Therefore from 4 years ago, we made $420.51 according to Axiom #5. QED.

EXAMPLE PROBLEMS AND SOLUTIONS

Question 1: You went to American Eagle and spent $500 on jeans and assorted garments. You received a $40 gift card due to a recent promotion. What is your net revenue?

Solution: $40 because you were planning on spending $500 anyway.

Question 2: Over the weekend, you spent $30,000 on a hot pink limited-edition Hermes Birkin Bag, $3,450 on 500 mL value size CRÈME DE LA MER moisturizer, and $900 for VIP access Era's Tour tickets. How much did you spend?

Solution: $0. These purchases are necessary investments in yourself according to Axiom #6. Birkin Bags, good skin, and memories will last much longer than the hole in your bank account anyway.

Question 3: After a hard day of classes, you're stuck on campus and thirsty. You can either go to the Starbucks at STC and purchase your favorite drink: a venti iced caramel macchiato with 6 pumps of caramel syrup and oat milk substitute for $7.97, or drink tap water. What's the cheaper option?

Solution: Starbucks. Since STC allows you to pay with WatCard, your purchase is free. On top of that, drinking tap water adds to your stress and academic anguish, increasing your likelihood of dropping out. Dropping out would be financially devastating, so it should be avoided at all costs.

Question 4: Coco's had a $3.28 promotion, and you bought 4 bubble teas. How much money did you spend?

Solution: $0. You bought 4, which basically means you got 2 for free. 2 bubble teas at Coco's are basically the price of 1 at DC Chatime and you can pay with WatCard so it doesn't exist. Therefore you got 4 bubble teas for free.

cherry ♡, Σ Diet Coke

Sources:
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000401
https://wowa.ca/inflation-rate-canada-cpi

HELLO KITTY IN AUTUMN

It's finally autumn, that means it's time to talk about Hello Kitty in this season.

This season, Hello Kitty's red bow turns orange for the leaves changing colours. It's time to read a book by the fire, have hot chocolate, and go on a walk!!

I hope Hello Kitty can inspire you like she inspires me.

k7hsu

SNAKE

Typing "snake" into the Google search engine brings up the definitive modern version of the game. Let us navigate the complexities of its options menu.

SETTINGS

FRUIT OR VEGETABLE TYPE

Cosmetic, juvenile.

GAME MODE

- Regular: consume the fruit or vegetable, grow in size. Simple, quaint, juvenile.
- Wall: consumption has chance of blocking off cells of board. Arbitrary, limiting, juvenile.
- Portal: fruit or vegetable comes in pairs acting as wormholes upon consumption. Mindbending, noneuclidean, enlightened.
- Swiss cheese: snake body alternates between existence and nonexistence from cell to cell. Mutilated, unbecoming, juvenile.
- Infinite: board does not end. Excessive, gluttonous, juvenile.
- Two-headed: snake head and tail switch upon consumption. Trivial, skillless, juvenile.
- Winged: fruit or vegetable moves along continuous paths. Worldbreaking, celldefying, juvenile.
- Yin-yang: control two snakes moving in diametrically opposite directions. Undemanding, nonthreatening, juvenile.
- Key: consume to unlock fruit or vegetable, then consume fruit or vegetable to spawn key. Slow, mindnumbing, juvenile.
- Crate: push crate onto designated cell. Labourintensive, tedious, juvenile.
- Skull: consumption of gray fruit or vegetable forces random movements from snake. Random, relinquishmentoffreewill, juvenile.
- Half-apple: fruit or vegetable swap between the corporeal and the incorporeal depending on score parity. Supernatural, nonempirical, juvenile.
- Flag: consumption spawns minefield regions that trigger within some timeframe of entry. Violent, warglorifying, juvenile.
- Statue: consumption turns part of snake to stone temporarily. Restrictive, inflexible, juvenile.
- Peace: you cannot die. Comes with quit button to manually end the game. Stupid, dumb, juvenile.
- Blender: randomize game mode. Indecisive, inexact, juvenile.

NUMBER OF OBJECTIVES IN PLAY

- One: meager, miserly, juvenile.
- Three: average, insufficient, juvenile.
- Five: bountiful, broadening, enlightened.

SPEED

- Standard: optimized, finetuned, enlightened.
- Fast: rushed, microcosmofasocietyinwhichattentioniscommodified, juvenile.
- Slow: sluggish, tearinducing, juvenile.

BOARD SIZE

- Standard: basic, absenceofexpressionofidentity, juvenile.
- Small: minimalist, efficient, enlightened.
- Large: wasteful, environmentallydisastrous, juvenile.

SNAKE COLOUR

Cosmetic, I like the pink-to-yellow gradient.

ENVIRONMENT

Cosmetic, juvenile.

SNAKE EYES

Cosmetic, juvenile.

SCORE TO BEAT

28

ʊ

mathNEWS REVOLUTION

Like a birdling flying for the first time, like a kid biking for a first time, like a convict walking free for the first time in fifty years. That is what we felt when it happened. When it finally happened. We got The None Pizza.

I don't know what convinced the editors. The majority support by the new first years? Having two people on the inside? The 9/11 disorg? We don't know. And we don't have to know. All we care about is that we had it there.

Now getting to the pizza. The looks, the texture, the taste—everything about it reminds you of freedom. Every bite represented the struggles of the people who fought for it. And even though not all the soldiers who fought were there, the ones who were made the most of it. It was one of the fastest-finishing pizzas and it stood for all its glory. It was enough to give us the satisfaction we needed for the moment, and also a tremendous[1] tummy-ache.

0.423 (ft. tendstofortytwo)

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1. https://tends.to/tremendous.wav

WHY THIS WORLD IS BETTER WITH GEESE

Imagine, for a moment, walking to class in the early early morning hours of 8:30 AM. You're tired. You're miserable. You didn't hear your alarm so you're late to class and everyone knows that the shortest distance between two points is a straight line, so you're cutting across the grass. Then, by some miracle, you see them. A beautiful group of geese, waddling around to your side. You stop directly in your tracks — not out of fear, but admiration. Have you ever seen a greater sight?

Let's look at their necks. Everyone knows that the goose plush from the W Store is adorable, but one thing you could never find outside of the real-life Canadian geese right here on campus? The *curve* of its neck. From its little white tummy to the end of its pecky beak, a goose is a work of art that cannot truly ever be replicated. People have tried, and failed, all in the pursuit of something greater than ourselves.

Next, there's something that can't be found in the goose plush at all! Two, actually, but I need more paragraphs to fight cats>geese on their objectively incorrect opinion. Also, they're a liar so half their arguments are already wrong anyway. The first thing that you won't be able to copy in a stuffed animal is the distinct and amazing Goose Waddle. As stated above in the imaginary but absolutely plausible scenario, you're walking up to a gaggle of geese on the ground. Right in front of your eyes, they come up to you, head bobbing then tail wagging.

cats is saying they don't have tails, but they do have tail feathers. In fact, they have so many feathers, not just on their bums. On their backs. On their lovely, lovely necks. On their giant wings. Isn't that wonderful? That geese can fly, even if we can't? In my dreams when I go to sleep in my prison dorm at night, I think of flying with them, side by side in the sky.

You might be walking near a pond one day when you spy an avian creature of the waterfowl variation down by the shore. But be warned — listen carefully in your approach. The main way to tell the difference between goose and duck or friend and foe is the sound that they make. Always listen for the honk of a goose, quack and squawk not included.

If you're still not convinced, sometimes you just have to look a little more closely. A goose can always be recognized not by its shape and not by its breed, but by its darling precious sweet cheeks. Standing out bright as a star against the night sky of its head is the distinctive mark of the Canadian goose's charming chinstrap. As you waltz up to greet them, take care to notice it within your line of sight, always smiling back at you.

Last but not least, let's not forget the sight of a goose sitting. Perched in the grass, posed for the pretty picture you know you're going to take of it, presiding for the important business it's about to conduct. On a visit, my friends even thought it was a statue, because who wouldn't want to preserve that perfect position forever? And that doesn't begin to even cover how it can stand in a flamingo position, which is a different topic altogether. And yet, it's time for the goose cuddle puddle right there on the green outside MC.

For my parting words: a flock, a team, a wedge. All these words and more to describe the different ways a group of geese can gather. What more could you ask for in life than to see every single one in action? That's all I have for you, cats. Love ya. And if you go out there and hug a goose right now, it'll love you too.

big a

GEESE SUCK, DON'T LET BIG A CHANGE YOUR MIND

The following message contains nothing but the truth:

Have you seen geese's mouths??? Those f*ckers have teeth on their TONGUES! That is NOT normal! I'll be walking around V1 and have to stop because they'll be standing, just CHILLING and NOT MOVING, in the middle of the path, and I'm too scared to walk through them because I'm not about to be late to class with the reason "goose attack." So I go onto the grass to get around them but it's (unsurprisingly) covered in geese sh*t and I have to jump around looking like an idiot in order to avoid the poo.

Then one day my girlfriend ran through a huge group of them as an initiation given by my friends and, as we were walking away, they all RAN AFTER US in revenge, and we thought we were going to die, I literally felt my soul leave my body. In the geese's defense, they were running away from a dog and not actually chasing us, but I will never forgive them. I was fully prepared to shove my short friend to the ground and sacrifice her to the geese.

Canadian geese have nothing redeemable about them. They're literally ugly. At least peacocks (the horrible creatures that they are) have pretty colours and stuff. Geese are just plain and boring and I hate them. One day I will take over the University of Waterloo and rid the poor students of the terrors we call geese (and also of engineers).

big a likes to say that they have nice curvy necks, but long necks are a feature of many an animal. For example, giraffes have super dope, super long necks that can curve as much as they want (have you ever seen giraffes fight? It's amazing), AND giraffes have blue tongues instead of teeth tongues. Therefore, geese are not special and they suck.

That being said, those goose plushies that the W Store sells are cute as hell and I want one with a little pink bowtie. At least the plush won't kill me.

Just remember: big a's article may be twice the length of mine, but size doesn't matter. I swear.

cats>geese

SURVEY RESULTS

As promised, here are the results of the survey I posted last issue!

In total, the survey received 83 responses, which was 3 times as many as I expected, so I'm pretty happy about that. I'm also pleased by the number of responses I got from different programs: 31 from CS, CS/BBA, and SE; 25 from other math programs; and 27 from other faculties. I was somewhat worried that I wouldn't get enough responses to do a confident analysis.

So, we might as well get the big question out of the way. Do the survey results support the stereotypes?

Well… no.

I had enough responses that I could do some chi-squared tests, so I tested the proportion for whether people were in CS and whether they were in the math faculty as a whole. In both cases, the shower frequency question and the anime/manga question both had high p-values (above 0.5) which does not support that those stereotypes were actually real (at a standard $p=0.05$ confidence level).

As for the furry question, only 4 people answered yes to that question in total, so I didn't include that in the analysis. If anyone was wondering, one was in CS/BBA double degree, one in just CS, one in stats, and one in business (presumably at Laurier).

Of course, there is a point to be made that people could have just lied on the survey. This is true, but I'm assuming that this didn't have a large effect on the result. The results would also have been better with a larger number of responses, but it's probably fine.

That concludes the main purpose of the survey, but I also want to share a couple other points. I asked the questions regarding term and gender in case I actually had positive results, but since that didn't happen, they ended up being irrelevant for the overall results. However, I did notice a couple things regarding those questions:

- Most people that filled out the survey were in first year (59)
- Of the people that filled out the question regarding gender, about 60% were male. This didn't change much when limited to just the math faculty, but within just CS, the proportion rose to about 80%.

Lastly, a fellow writer suggested a reason why the results for the shower question specifically might be as even as they were. He proposed that math students that are not CS students are more likely to take the shower question literally. Since the question asked about the average number of showers per day, taking it literally one should answer no, since most people have skipped at least one day in the past year. This would

offset the variation caused by CS students actually showering less. To this, I have included the following analysis:

Thanks to everyone for filling out the survey. I hope people enjoyed reading the results!

hyperlynx

SMALL C, BIG W

WHAT IS SMALL C?

There was a math contest last week for first and second years and it has come to my attention that not everybody eligible participated, and so it is my goal to tell you what it is, and why you should do it next year (if you'll be a first or second year in 2024). Small C is a math competition with 25 questions, testing high school math skills in the time span of 111100 minutes, featuring fun problems similar to those in the Euclid or Senior Math competitions most of us did in high school.

WHAT ARE THE RULES?

The rules are pretty standard for a math competition, such as scissors are only allowed for fourth-year students and all jokes relating to the Toronto Maple Leafs must be strictly kept outside the testing room.

WHAT ARE THE QUESTIONS LIKE?

As for the questions, there are 25 ranging in difficulty, starting with proving you have the chops to wear a Waterloo math hoodie using basic arithmetic to whatever the hell is going on in question 25 — I didn't get that far. Here's a question to give you a taste (you can find more on the Small C website). "GROWTH IN INFLATION RATE IS SLOWING DOWN", where inflation is the rate of increase of a index function $p(t)$. What function must be negative? $p(t)$, $p'(t)$, $p''(t)$, $p'''(t)$, $p''''(t)$?

BIG W

Hopefully I've managed to convince you to write it next year, or more likely you're not going to be eligible, which in that case I can also stop trying to convince you. But if you're in the former case, then good luck, remember that at least one of the answers is **B**, and definitely don't forget to register your Elongated Pentagonal Orthocupolarotunda if you choose to bring one.

Als u dit kunt lezen, spreekt u het Nederlands.

Aspiro

TOP TWELVE AND A HALF WAYS TO GET LOST IN LIFE

Are you looking to be physically and/or mentally lost or want to bond a community over this common feeling? Well, do I have the strategies for you! Inside lays 12.5 ways to feel like you're emotionally in a garden maze (make that 13.5!).

1. Try to find a classroom in either Hagey Hall, PAS or 4th floor MC, just because the architecture students used ramen noodles and Chex cereal as inspiration
2. Grocery shop at Walmart and end up looking in the clothing section, debating with yourself if you should get a Superman shirt when you don't even care for DC (The hash browns at the DC Tim Hortons are great though, don't get it twisted)
3. Take the local route back to the GTA because 401 Traffic™ is a constant nuisance (like me!), yet not know your surroundings because it's all just grass and roads named after basic old dead men
4. Go to the wrong floor in DP and wonder why it's so quiet, especially when your chair squeaks and you wander in circles looking for a corner spot with a jangling backpack and loud stomps (shhhh, sorry!)
5. Just exist as a first-year (or a confused upper-year, I see you too)
6. Let your crippling insecurities and imposter syndrome get to you as you huddle in your bedroom in the late Sunday hours, avidly searching for motivation to touch your English assignment
7. Lose your friend at a nighttime event and running around while they're running around looking for you so for five minutes, you're left with your fear of loneliness and making it entirely complicated for yourself
8. Go down a Wikipedia rabbit hole for hours, only to end up wondering how got to reading about William Lamb, 2nd Viscount Melbourne from looking up sheep intestines (yet also questioning why you were looking up intestines in the first place? Oh wait, historic syphilis rates got you there.).
9. Take the hypotenuse route in life in a right angle world.
10. Peruse the aisles of FreshCo with your family only for them to presumably leave you (after all, they did threaten to leave if you spent too long looking at lotion) and so after repeatedly searching the whole store for them, you walk home only to realize 40 minutes later that they never left and were never going to.
11. Look at your smart friend's MATH 145 assignments while you're suffering with MATH 135 proofs, making you wonder what admissions officer thought you were a good choice.
12. End up on the Laurier side of town and scurry randomly around town, trying to avoid both the BBA kids and the sunlight.
12.5. Go to a **mathNEWS** production night in Biology 1.

Dollar Store Person

LITTERFALL

Sun is shining
Birds are singing
Flowers are growing
Clouds are looming and I am dying

The milk is sour
I've barely been to college
And I've been doubtful
Of all that I have dreamed of
The brink of my existence essentially is a comedy
The worms on my back and all that I can cling to

Sun is shining
Birds are singing
Flowers are growing
Clouds are looming and I am dying

If you don't go outside
Well nothing's gonna happen
She'll never write her number on a crumpled up napkin
She'll never be your ego
She'll never be a bandit
She'll never get to eat you like your heart's a pomegranate

Let the flash flood begin!
Wash me down the canyon!
Quicksand pull me in!

I'm throwing out the milk
The ground got old
I'm tired of my mind getting heavy with mold
I need to start a garden
I need to start a garden
I need to start a garden
I need to start a garden!

Sun is shining
Birds are singing
Flowers are growing
I am living and I am dying

Andy Van Slyke

WHY N?

Why the naturals? Why multiplication and addition; why one and zero? Why exponentiation and factorial?

Let's go back to the beginning. Why were the naturals invented? To count things. If two sets are isomorphic, they should have the same size; if they're not, they should have different sizes.

So take the finite sets, and equate the isomorphic ones. You're left with the naturals.

Why the naturals? Because finite sets.

<div align="center">❧</div>

What can you do with sets?

Well, there's the Cartesian product. Given sets A_i, a *product* of the sets is a set $\prod_i A_i$ equipped with projections $\pi_i : \prod_i A_i \to A_i$. We require that for any given a_is, there is a unique choice of $a \in \prod_i A_i$ such that $\pi_i a = a_i$ for all i.

Products can be implemented, for example, as tuples with one element from each A_i.

What happens when we count a product? We get… a product! $|\prod_i A_i| = \prod_i |A_i|$.

In particular, if there are just two A_is, this gives us the traditional multiplication operation. Also interesting is what happens when there are *no A_is*…

Exercise: Check from the definition above that a cartesian product of no sets is a singleton set.

So that's why $1 \in \mathbb{N}$.

<div align="center">❧</div>

Next, there's the disjoint union. Given sets A_i, a *disjoint union* of the sets is a set $\coprod_i A_i$ equipped with injections $\iota_i : A_i \to \coprod_i A_i$. We require that each element of $\coprod_i A_i$ can be written as $\iota_i a$ in exactly one way.

Disjoint unions can be implemented, for example, as pairs whose first element is i and whose second element is in A_i.

When we count a disjoint union, we get a sum. $|\coprod_i A_i| = \sum_i |A_i|$.

In particular, if there are just two A_is, this gives us the traditional addition operation. Again, the case where there are *no A_is* is interesting.

Exercise: Check from the definition above that a disjoint union of no sets is empty.

And that's why $0 \in \mathbb{N}$.

Exponentials and factorials come from sets of functions and isomorphisms, respectively.

$$|\{f : A \to B\}| = |B|^{|A|}$$

$$|\{f : A \leftrightarrow B\}| = \begin{cases} |A|! & |A| = |B| \\ 0 & \text{otherwise} \end{cases}$$

Even the laws of arithmetic come from sets. As an example, the equation $a^{b+c} = a^b a^c$ comes from a nice isomorphism between $\{f : (B \amalg C) \to A\}$ and $\{f_1 : B \to A\} \times \{f_2 : C \to A\}$.

Why addition, multiplication, and exponentiation? Because disjoint unions, Cartesian products, and sets of functions.

finegeometer

$0 \in \mathbb{N}$, because $\emptyset$ is a finite set.

N NICE PLACES TO GO STARGAZING
SPONSORED BY MY GAS BILL

- V1 Green is nice because everyone knows where it is if you want to meet them. The sky isn't great though due to all the bright streetlights around you.
- Columbia Lake Firepit has a hill that goes down towards the lake, which blocks a lot of light coming off the residences. It's also pretty easy to get to from campus.
- The Columbia Lake Island is, in my humble opinion, the best spot on campus for stargazing, since there is pretty minimal light around you if you find a good spot. The one downside is that people don't tend to know where it is and it's pretty out of the way.
- Waterloo Park is quite open and some parts of it are pretty dark (spooky). But with all the city lights surrounding you you'll have trouble seeing many stars.
- If you can find someone to drive you, I recommend driving West of Waterloo for at least 20 minutes, and finding parking wherever it isn't likely you'll be ticketed or yelled at. When we look South in Waterloo, we look through all of the city lights, so we can't get a good view. But here we sidestep that and have a nice Southern Horizon.
- I also recommend driving a similar distance North, because in about a 180° horizon, there aren't any major cities, so the view is pretty nice.
- Places I do not recommend: In general anywhere in the city, Laurel Creek, the roof of V1 (just go to the green) and through your window (go outside).

Shahabee

EARNING 1 MILLION DOLLARS

In this article, I will prove the Riemann hypothesis. Overall I would say it was pretty easy. I'm hoping some other proofs will pose a real challenge.

The Riemann hypothesis is the conjecture that the Riemann zeta function has its zeros only at the negative even integers and complex numbers with real part ½. This was diligently copy-pasted from Wikipedia, so it is accurate. The prize for its proof is $1,000,000, which I hope to claim here with this proof. All the other people who have claimed to have proved it themselves are charlatans, as I have used the only method that works.

Lemma 1. $1 = 2$.

Proof. Let $a = b$ for some integers a, b. Then we have

$$a = b$$
$$a^2 = ab$$
$$a^2 - b^2 = ab - b^2$$
$$(a + b)(a - b) = b(a - b)$$
$$a + b = b$$

Since $a = b$, we can substitute into the equation:

$$a + b = b$$
$$b + b = b$$
$$2b = b$$
$$2 = 1$$

Remarks:

1. From this, it follows that 2 = 3, 3 = 4, 4 = 5, 5 = 6, 6 = 7, 7= 8, 8 = 9, 9 = 10, 10 = 11, 11 = 12, 12 = 13, 13 = 14, 14 = 15, 15 = 16, 16 = 17, 17 = 8, 18 = 19, 19 = 20, 20 = 21, 21 = 22, 22 = 23, 23 = 24, 24 = 25, 25 = 26, 26 = 27, 27 = 28, 28 = 29, 29 = 30, 30 = 31, 31 = 32, 32 = 33, 33 = 34, 34 = 35, 35 = 36, and 36 = 37.
2. While easy to show, other mathematicians have thus far not been creative enough to use this in the proof of the Riemann hypothesis. So I guess this is me, the early bird, getting the million-dollar worm.

Lemma 2. All rational numbers are equal.

Proof. Consider a rational number $\frac{1}{n}$. We will prove that this is equal to n.

$$n = \frac{n^2}{n}$$
$$= \frac{n^2}{n * 1}$$

But since $1 = 2$, we can cancel the 2 on top with the 1 on the bottom. This one made me feel like a genius when I found it.

$$\frac{n^2}{n * 1} = \frac{n^0}{n}$$
$$= \frac{1}{n}$$

Remarks:

1. This is obviously logically equivalent to stating that all rational numbers are equal. If you weren't already thinking that, that says a lot about you as a person.
2. The significance of this development will send shockwaves through the mathematical community. If I can spin it the right way, it might even help me get a slice of free pizza tonight. Now THAT would be something.

Using this result, we can finally show that all the real numbers are equal to each other as well.

Lemma 3. All real numbers are equal to each other.

Proof. Let x and y be arbitrary real numbers. Suppose for a contradiction that $x \neq y$. Then we have that $ax = y$ for some $a \neq 1$. Using this, we can show that:

$$ax = y$$
$$1ax = 2y$$
$$\frac{1}{a}x = 2y$$
$$\frac{1}{a} = 2y - x$$
$$\frac{1}{a} = y$$
$$a = \frac{y}{1}$$

But remember from the first proof that $a = b$. Therefore, we can let $b = y$ and let $a = 2$ to get:

$$a = \frac{b}{1}$$
$$2 = \frac{2}{1}$$
$$1 \cdot 2 = 2$$
$$2 = 2$$

This is clearly a contradiction, as $1 = 2$, therefore $2 \neq 2$. Therefore, for all real x, y we have that $x = y$.

Remarks:

1. The complex numbers are basically just the real numbers but with extra steps, so all complex numbers are equal as well.
2. Other mathematicians don't want you to know what comes next! According to STAT 231, only a small percentage of my readers are actually subscribed. Be sure to like and subscribe and ring the bell and comment and join my Discord and ~~tweet~~ X about me so you never miss any of my proofs.

Since the Riemann hypothesis deals with complex numbers, and all complex numbers equal each other, it quickly follows that whatever he said about something equalling something else is true. Hence, I deserve one million dollars. QED.

Now, unfortunately, since \$1,000,000 = \$0 by our earlier result, I may not actually receive any money for this amazing feat of logic. But now that you've read this, whenever anyone else comes along with a proof of the Riemann hypothesis, remember this: I was here first. Take that, Riemann.

u/iamverysmart

WHAT DO YOU EXPECT?

based on 4 years of experience, when you work in leadership roles, or specifically student leadership roles, you are signing up for the following:

- low engagement or participants solely driven by food
- inept/flakey volunteers
- little to no appreciation or compensation

and it does not matter how much time you spend on it, how much advertising you pull together, or how in depth you've thought through your event/club/initiative. at least here and now, that's how it ends up. it's inevitable.

in addition to the learning experience, soft skill examples for resumes/interviews, you also get the following:

- lower grades

- mental episodes caused by pre-existing mental issues, diagnosed or not
- varying levels of disdain and respect for your superiors and subordinates
- foresight to evade other opportunities that have people shit on your work and pay dirt

i'm lucky to have developed coping mechanisms, namely substance abuse. and for reasons, traumatic or not, there are people like me who continue to serve the student body. we're a tight knit bunch. not because we go out of our way to spend time together; we just happen to be the only ones who consistently show up.

we learned to use the following strategies to our advantage:

- roping in friends/acquaintances to increase numbers
- providing *more* free food, snacks, or drinks
- handholding every volunteer while shouldering every decision

and it's belittling. i'm reducing my event to a free lunch when marketing it to its intended audience. i have to beg people to sign up and then get disappointed when they can't make decisions on their own. i'm withholding so much information because at the end of the night, there's no one beside me to reflect and move forward with what i've learned.

☙

i've never cared about money. at a certain point, i no longer needed the experience. maybe i did want recognition for everything i've done for the school but now i'm indifferent and numb. i don't want anyone's sympathy or condolences. i just wish it was easier to satisfy you, to make your experience better but physically i cannot cater to hundreds who expect…

well… what *do* you expect? what do *you* expect exactly?

☙

it's always been about managing my expectations. i cannot expect that if i do an amazing job, people will want to do just as well. that people will build off of my framework and be willing to reinvent practices for the better. that individuals will step up and take initiative when the incentive just isn't there for them.

you will expect so much of me but then i must resign and expect nothing from you. from any of you.

☙

i can't tell you what to feel or how to grieve. blame whoever you think is responsible, but there's no way that will make it easier for anyone like me.

kombucha

HOW THE SLOVENLY EMPEROR OF SPACE-TIME ENDED THE UNIVERSE AS WE KNOW IT

SETTING: A dark cavern with an empty stone throne at its center.

CHILD holds a flickering torch as they walk in. Shadows shiver and shrink.

CHILD: O Great Emperor of O'Rashad, I've come to ask for your favor in a matter of great importance.

EMPEROR (*an incorporeal voice*): You should know better than to come… this very moment.

CHILD: Sorry?

EMPEROR: They're feeding me grapes on a silver platter in another realm. Sixteen, perfect, glistening, grapes… but you fools, you say *Great Emperor of O'Rashad*, and I get flung back here like… like a collapsing puff pastry. Do you guys have puff pastries here?

CHILD: …No?

EMPEROR: Outrageous! What good is it to live without puff pastries!

CHILD: Never mind your puff pastries!

EMPEROR: Never mind? You dare—

CHILD: I came here with a purpose! Do you know how many weeks by *foot* it took to get here?

EMPEROR: And it didn't occur to you that the Emperor of Space-Time And Everything Beyond would not want to be bothered? That they may have *greater* affairs to attend to?

CHILD: Not really. I'm the focus of my own narrative. Not you.

EMPEROR: You know what? I like your gusto. I'll humor you. But make it quick.

CHILD: Great. You see, my father's dying—good riddance, he was a bastard. Problem is, I've got a twin and only one of us can be king. Can't have two kings in a monarchy, you know?

EMPEROR: Right, right. Monarchy. I remember the day I came up with that one.

CHILD: But my brother's pretty much better than me in every way. He scores higher on the quals, he's more personable with the townsfolk, and he's got our mother's loving blue eyes.

EMPEROR: Wait a minute. You're the other one?

CHILD: That is part of the problem. Yes.

EMPEROR: Why do I feel like I hit a nerve?

CHILD: Don't worry. I'm used to it. Anyways, I was thinking I would kill him.

From the stalactite ceiling, a cobalt snake drops upon the throne, coiled, much like the domestic ball-python. The heavenly body of THE GREAT EMPEROR OF O'RASHAD slithers before CHILD. A strand of their hair flicks up in the kerfuffle.

EMPEROR: You would do *what*?

CHILD: Wow. This is you?

EMPEROR: Yes, yes, it is I. Skip the supplication and superlatives, and get on with it. I can't believe I'm here instead of eating grapes.

CHILD: I was gonna say you've got some pebbles around…the fifth segment of your body?

EMPEROR: Oh. That bit. You know it gets old, taking the multiversal elevator. I started making these space-time rifts, but I've been eating well the past few millennia, and the rifts don't so much change in size with me—

CHILD: It's kind of hip that an emperor of Space-Time has body image issues.

EMPEROR: Woah, woah. Don't say hip. You lot on this rock won't ever go through that phase of AAVE appropriation. I just won't see it happen.

Mist clouds the set. Multiverses distort. A timeline is rewritten.

CHILD: It's okay. You know you are beautiful just the way you are, right?

EMPEROR (*aside*): I way overdid it.

EMPEROR: Forget that—my body image issues give me character depth. I won't ever get over it. Anyways, you were going to do what to your brother now?

CHILD: KILL, I was saying how I'll KILL him.

EMPEROR: Why are you screaming?

CHILD: I thought you were having trouble hearing? That's why you asked, no?

EMPEROR: No, no, that was my emphasis for bewilderment. Wow. You're really bad at this following-the-narrative thing, aren't you?

CHILD: Well. I'm here, aren't I?

EMPEROR: Point taken. So what would you like me to do about your interpersonal conflict? Not sure helping you would yield any cosmic good, if I'm honest.

CHILD: You can't mean that the purpose of it all is net cosmic good?

EMPEROR: Oh, no. That was more like a figure of speech. If you really want to know—it's about our investors, the Emperors of Space-Time beyond the Emperor of Space-Time watching this Narrative unfold.

CHILD: Ah. Right. That's more like it. So what you really mean to say, is you won't help me because what I'm doing isn't fit for the investors.

EMPEROR: More or less.

CHILD: Okay. How about this? I love my brother—as much as I can love a twin. I don't want to kill him at this very moment. I'll wait until he's half-way done with his rule. That way I'd get my share of being a monarch. Fifty, fifty. It's only fair.

EMPEROR: Now you're just trying to appeal to the universe's tendency to equilibrium.

CHILD: Well? Is it working?

A sourceless light beams down upon CHILD.

EMPEROR: …I can't believe this is actually working.

CHILD: Monarchs are hard to kill here! Sanctions, paperwork, fallout and all.

EMPEROR: For good reason.

CHILD: But you can make an exception in the name of equilibrium, right? Help me kill him. I won't do it until the year he's trying for a child.

EMPEROR: Well, that's reasonable enough. You guys here never live too long.

EMPEROR unrolls the last segment of their scaled body. At the very end, balanced upon their luminous stinger—a black dagger.

EMPEROR: There. If you use that to kill a king, the narrative will close itself upon your action. Like skin resealing a wound. No sweat, no hassle. Careful now. I don't give these out often, okay?

CHILD, holds the cold obsidian blade and watches the play of light upon its silky edge. CHILD presses their thumb against the flat of the blade.

EMPEROR: Careful! You don't know what that can do!

CHILD: Oh, but I do.

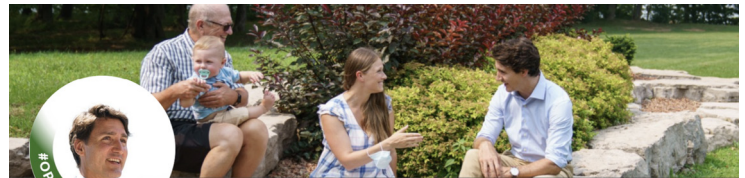*CHILD plunges the dagger into the EMPEROR'S scaly belly. The serpent collapses, segment tesselating into segment tesselating into air. Smoke clouds the sets. Multiverses dist—*

THE MONARCH: Oh, quit that. I won't have any of this multiverse business. Now…

Why hello there. You've been here the whole time, haven't you?

<div align="right">varicose</div>

LIBERALS CONCERNED AFTER JUSTIN TRUDEAU UPDATES LINKEDIN

<div align="right">UW Unprint</div>

"BUBBLE" TEA

there are SO MANY "bubble" tea places within biking distance of campus but i have yet to find one with actual popping bubbles. the ones that have the good texture. not chewy. not slimy. just a thin layer of skin around a droplet of liquid to roll around in my mouth and then bite to give my brain *the good chemicals™*. so disappointed in this community…

<div align="right">sexy_software_babe</div>

to help my disappointment to dissipate please send suggestions of bubble tea places within biking distance of campus to kayliafsubmissions@gmail.com ok thx byeee

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ODES MORE LIKE

ODEez Nuts

<div align="right">Gottem.</div>

THANK MR. GOOSE
A NIGHT YOU'LL NEVER FORGET

It's a dark and stormy night, and you're studying late at MC. There is a loud crash of lightning outside the window, and the power flickers in the room. You feel the panic flood through their body, and your breath catches as the room goes dark. You look around the room, the faint glow of the laptop lighting up your face in the darkness of the room. The rain crashes against the window. It rains so hard that you feel scared to go outside.

Being deeply committed to (insert your religion/spiritual practice of choice) you decide to get on your knees and pray. You close your eyes and beg (insert deity) to save you from a power outage tonight. You need eduroam to stay on so that you can complete the LEARN quiz you have due at 11:59pm, only 20 minutes away. You close your eyes and keep praying, a single teardrop falling onto your cheek. For a moment you feel the gentle caress of feather wiping it away. Startled, you open your eyes, but you don't see anyone around. You hear the echoing honk of a goose behind you, and you turn. Then you see his luscious dark silhouette, and wings spread in the dim light at the end of the hallway. It's Mr. Goose himself. Your breath catches, as you take a step, hearing a final honk before the light at the end of the hallway goes out, leaving you in complete darkness. Your heart thuds as you turn and the lights come back on. Standing in front of you is none other than the professor for whom you're quiz would soon be due. You can't believe their eyes. (Insert deity) must be real after all! The power of prayer has saved you.

"Professor (insert professor name), can I please have an extension on the quiz!" They turn to face you, but something is very, very wrong. Where the professor's eyes should be, there are large, misty orbs of blue light looking at you. "Waiting until the last minute again, y/n. You should have asked me at the end of Wednesday's lecture! But I accept your terms. You have until tomorrow evening." The Professor snaps their fingers, and the deadline on your LEARN quiz changes! You fall to your knees as the professor smiles before disappearing into a cloud of smoke. Unfortunately, you have asthma, so you cough up a storm. As the smoke dissipates, you realize it might have actually just been a cloud of chalk dust. When it finally settles you see an equation written on the wall: "A SQUARED PLUS B SQUARED EQUALS THANK MR. GOOSE".
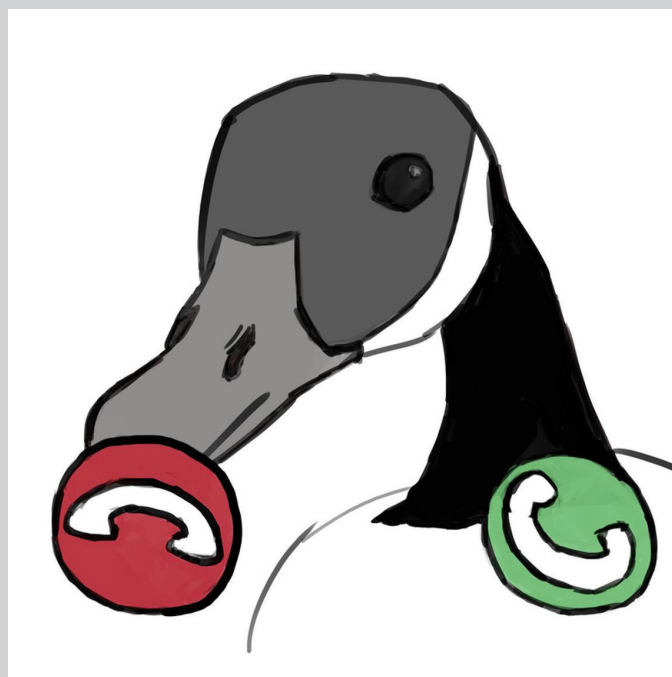
A math student yourself, you recognize the first half as the iconic Pythagorean theorem, but the second half catches you off-guard. What could this equation mean? Unexpectedly, you've been presented with an enigma as trying as when you last attempted to decipher the meaning behind "UWU". You immediately forget about the quiz and start writing on the chalkboard, deciphering it. After performing rigorous calculations to no avail, you type the formula into Desmos to see the graph of the equation. When you type it in, "Y/ N+WATERLOO" appears on the white screen. You let out a gasp, as all the faculty mascots appear in front of you. The Big Banana. Cobalt the Dinosaur. The TOOL. Porcellino. King Warrior. AHSSIE. And last, but certainly not least, the Pink

Tie. They put their hands together and spin in a circle, and lift their hands up as Mr. Goose appears in a flash of light.

This time, he is the centre of attention. You can see more than his luscious silhouette as his ebony, onyx and ivory head glimmers in the yellow light. His beady black orbs stare right through you. You are entranced. Once more, a cloud of smoke erupts. This time it fills the whole room, so you know its smoke for real as you breathe it in, it smells like weed and you are excited to get high (for free). You close your eyes and enjoy the aroma. When you open them again, the mascots have surrounded you. Confused you stay still, and you ask yourself, *how high am I????* then they begin to clap and dance around you. They begin to chant "WATER WATER WATER, LOO LOO LOO". Mr. Goose is nowhere in sight. Your professor returns. From where? You're not quite sure. "SAY IT, SAY IT NOW," he says. "SAY WHAT?" you yell. "THE PASSWORD, THE ONE YOU UNLOCKED ON DESMOS" he exclaims. "Y/N PLUS WATERLOO!" you scream and then, another flash of lightening strikes and thunders outside. When the noise dies down, Professor (insert name) says "Congratulations y/n, welcome to Knowledge Integration." Finally, you have successfully transferred your program. Goodbye Faculty of Math…. Goodbye Desmos… THANK MR. GOOSE. (The End)

Your Mom

ACCEPT/DECLINE

BiMath

PUMPKIN COOKIES
SMALL BITES OF A GOOD WORLD

You know how there are those things that everyone is expected to just *know?* You know how sometimes, the memo about these things gets lost in the mail, and you're left scrambling to catch up, pretending that you're working from the same knowledge base as everyone else?

Unrelated question: BYOB means Bring Your Own Baked Good, right?

I don't drink alcohol, so I hope that it does. I generally bring bite-sized cookies to parties in place of drinks I know nothing about. They're generally well-received; by the end of the night, I only ever have one or two cookies left to bring home.

This weekend I brought pumpkin cookies to a party. They disappeared in thirty minutes.

Here's the recipe.

INGREDIENTS:

- ½ cup butter[1]
- ¼ cup brown sugar
- ½ cup white sugar (plus extra ¼ cup)
- ⅔ cups all purpose flour[3]
- ⅜ cups tbsp of pumpkin puree[2]
- 1 ½ tsp cinnamon (plus extra ½ tsp)
- 1 tsp vanilla extract
- ¼ tsp of each: baking powder, baking soda, ground ginger, ground nutmeg, allspice
- 1 cup oats[4,5]
- ½ cup white chocolate chips[5]

STEPS:

1. Melt the butter
2. Using way too much paper towel, press the water out of the pumpkin puree until it mostly stops spilling water all over your kitchen counter. Do this until it reduces into 6 tbsp of less-wet pumpkin.
3. Combine the melted butter, brown sugar, ½ cup of white sugar, vanilla, and blotted pumpkin, and mix until completely combined. In another bowl, combine the flour, baking powder, baking soda, and spices. Pour into the wet ingredients and mix together. Mix in the oats and chocolate chips.
4. Chill for at least 30 minutes and at most several days.
5. Roll into small balls and put onto a baking sheet. Bake for 10–11 minutes at 350°F.

NOTES:

1. If unsalted, add about two shakes of salt to the bowl with the flour.

2. If you figure out how to obtain pumpkin puree in quantities under 32 tbsp per can, please let me know i beg of you please
3. When scooping flour, it's often recommended to take it out from the bag by the spoonful, rather than just sticking the entire measuring cup in at once. This helps to avoid accidentally packing in too much flour.
4. Any type will do, but oats with longer cook times (i.e. not quick oats) are better.
5. In practice, this is a baseline. The actual amount used should be based entirely on vibes.

molasses

It seems like there's a lot of bad things all at once recently. But I've been trying to write happier articles, so amid all that, this is me sharing a good thing. The hearth remains alight amidst the snow. And you always deserve to reclaim its warmth.
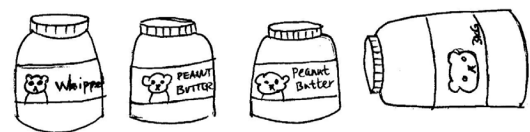
ANNOUNCING THE RESULTS OF "MODELLING THE VOLUME OF A FILLED DONUT"

Congratulations to *not_a_uw_student_(yet)* for winning the contest! Your donut and method of delivery will be discussed via email correspondence to be sent within 2 business days. The method you submitted was indeed one of the methods employed (initially) to evaluate donut volume. Although, one tends to forget that the meter stick can also be deployed as a knife to cut open the donut to gain an actual reading on the dimensions of the filling. (Even though it would not be enjoyable as a donut afterwards.)

The "official" methodology of measuring both of these items will be revealed in the next issue in Part 2 of *A Statistical Analysis on the Boston Cream Donut Fillings,* as the canonical answer is left as an exercise for the reader for those who are impatient. (It is totally not due to the author's forgetfulness.)

Also, your LaTeX tip of the day: use \text{enclosed text} to allow for proper text formatting in math mode!

RobbotC

jif *of the day*

777 WORDS ON TREATS

Let me set the stage for you. You are at a high school football game, sitting on the bleachers with your friends, anxiously anticipating the halftime cheerleading routine. The girls start walking on the field and taking their places, only, you notice something… their outfits are nearly torn to shreds. The music starts and it practically blows out the speakers. Instead of shouting inspirational chants, the cheerleaders are making fun of every clique in the school while somehow managing to still adhere to a rhyme scheme. You look around… spectators are punching each other, football players are being thrown around by teachers, and even your own friends are beginning to look deranged.

High school hell is an apt description of noise pop duo Sleigh Bells' debut album *Treats*. Released in 2010, the record garnered critical praise (including a very high score of 8.7 from *Pitchfork*) and is known for its seamless fusion of rather distinct genre elements, all pushed into the red on the sound mixer. The cover features your typical pyramid of cheerleaders whose faces are distorted beyond recognition and whose pom-poms seem to have been adorned with snow. Immediately, you know that something here is not quite right. The music itself is also heavily distorted, combining aspects of electronic, punk, and even metal into the delightfully noisy pop song structures. Trust me when I say that it sounds like cheerleader music, except the cheerleaders are anything but optimistic and are routinely on hard drugs.

The opener "Tell 'Em" shoves you right into the fray with its abrasive drumming and guitar riffs. Vocalist Alexis Krauss can barely be heard above the sheer volume of the instrumentation as she almost raps about rejecting the 'cool agenda' and doing your best. She also says cocaine and champagne in succession which is a bit of fun. "Kids" comes next, describing a harmless trip to the beach that eventually devolves into a disaster, complete with a thunderstorm and a potential drowning incident. Does the narrator care? Absolutely not. Her only concern was sipping her Kool-Aid and tending to her minor sunburns.

"Riot Rhythm" is the closest the record gets to an actual cheerleading anthem, both sonically and lyrically, while still maintaining just the right amount of menace. Being "carved out" sounds scary. "Infinity Guitars" goes crazy with the distortion towards the second half, almost resembling a metal song. Alexis is just speaking nonsense but once again, evil never rests, as the girls claim to have "red souls" and "red friends." "Run the Heart" and "Rachel" both shy back a bit in terms of loudness, incorporating shimmering synth loops and oddly calming vocal performances. While "Rachel" offers some temporary solace through a shocking expression of cheerleader compassion, has the chaos come to pass completely? Fortunately not, as the cheerleaders taunt the listener and threaten to take them out during "Run the Heart." Quite the dichotomy there.

If something on "Rill Rill" sounds familiar to you, you are very cool, as it samples a well-known song by Funkadelic and

was also featured in an iPhone commercial. This is the most lyrically substantive track on *Treats*, depicting the fallout of a group of friends amidst a schoolwide popularity contest. It is also a nice break from the noise. "Crown on the Ground," my personal favourite, is the cheerleading squad's response to pretentious people and their high horses. The lyrics are quite scathing, not only calling them out, but shaming them and rendering them speechless. Stay mean, girls.

"Straight A's" is basically screamo. Need I say more? "A/B Machines" only has two lines but they are repeated 34 times, just to ensure that you heard them. It is a funny song in that the lines make no sense, yet they are sung over and over again as if they do make sense and are meaningful. Finally, the title track's rhythm is certainly a treat, ending the album on a powerful, boisterous note, despite some more nonsensical wordage. I like to think of the last three songs as the end of the squad's routine that they forgot to rehearse because they were too busy planning world domination.

The greatest, and frankly most impressive, part about *Treats* is that one would not expect this theme and sound palette to work, yet it just does. The paragraphs that preceded may completely turn you off from listening—which is reasonable since my first venture just made my ears hurt—but if you can get past the noise, you will find a strangely charming and kick-ass record that is sure to bolster your confidence. I will not be held responsible for any murderous rampages carried out by students in cheerleading uniforms, however.

jimbitsgalore

FORGETTING TO PUT YOUR PSEUDONYM ON AN ARTICLE BEFORE SUBMITTING IT

would be a ridiculously silly thing to do, right? No one would ever do that. They would have to be really not in their right mind to forget such an important part of an article.

hyperlynx

POV YOU CAN'T MATH

I'm a math student. I need calculators since I can't do basic arithmetic. Yes, we exist.

… did I mention I can't do basic math?

I don't know how, I don't know why, but whenever I need to do math without a calculator, my mind goes blank. I can do pretty complex stuff …, sometimes. I can probably understand most of what goes on in my Math 135 class, I think. But give me 50 basic arithmetic questions to do in a minute and I'm doing worse than a 5-year-old who doesn't know their numbers. It's so bad I wonder how in the flying fuck the world I got past grade 2 math, let alone into the University of Waterloo.

Take me in my Math 135 class. The class is great… for now at least. But I kid you not, I've messed up 2 + 3 + 3, and thought that was 7. Seven. If I had the brains to even take out my fingers and count on them, like a kindergartner, I would've gotten that right. A. FUCKING. KINDERGARTENER. Like you wouldn't even expect this from arts majors who hate math more than the average UW student hates the cobra chickens that attack us every day *(sorry arts kids, Math loves Arts <3)*. WHO IN THE WORLD GETS THAT WRONG. Me, I guess. I remember spending what felt like an hour trying to figure out my problem (it probably was like 2 minutes then my prof took it up) and I thought all my steps were right. I THOUGHT since all my steps were right. To be fair, in my defence, who EXPECTS to mess up such an easy question.

It gets better. Cue my Math 137 quiz, where calculators aren't allowed. I had to use the quadratic formula to solve an equation. Something all engraved in our head. Heck, there's even a song for it:

x equals negative b, plus or minus the square root of b squared minus 4ac all over 2a

You may think I messed up somewhere tricky. Maybe it's the square root section? Or the plus-minus?

… I messed up on the first section: -b.

(-(-1)) IS NOT -1. (-1(-1)) IS NOT -1

That's what I kept telling myself after the quiz.

If it wasn't clear, that's where I messed up. I thought -(-1) was -1

Like the first ever thing you learn when you learn negative numbers, is to flip the sign from positive to negative or vice versa. You wouldn't even expect this mistake from someone who just started learning negative numbers. You wouldn't expect this from anyone. Except me.

If I'm gonna be completely honest here, I don't even know how I do this. How am I able to understand more complex shit including contest problems but mess up stuff even toddlers can probably do. If anything, it should be the opposite.

Welp, tis is the life of a first-year math major, oh well. Hopefully, I can use calculators in courses not named STAT xxx

… oh wait

joesunsunjoe

THE HOLLOW STUDENT
AND ALSO AN ODE TO WATERLOO

No sleep too valuable.
No heart to love.
No wills left unbroken.
No voice to cry suffering.
Born of Flesh and Void.
You shall write midterms that precede your dreams.
You are the unbreakable.
You are the Hollow Student.

჻

In schools beyond they speak your name with reverence and regret,

For none could educate our feeble souls yet you the challenge met,

Under managerial watch, you taught, we changed, instincts… almost redeemed,

A world you gave to undergrads as they had never dreamed.

andoiii

SO… HOW DOES THE SAUSAGE GET MADE?

According to the Merriam-Webster dictionary, the English idiom of "how the sausage gets made" refers to **"the practical and often unpleasant or messy aspects of a process that are usually not made public."** It got me thinking about how sheltered most people living in rich developed countries are.

Smartphones and other devices that use rechargeable lithium ion batteries contain cobalt, the vast majority of which is mined in the Congo, by children as young as six. Mica, a sparkly mineral found in nearly all cosmetics, is similarly often mined by children in incredibly dangerous conditions. Mines frequently collapse, and often kill or maim the miners. All this just so people can enjoy a little sparkle on their faces.

Almost every piece of clothing you own and wear was made by underpaid workers, likely in incredibly dark, dangerous and unpleasant conditions. They were likely dyed using harsh chemicals that the workers have no choice but to breathe in. The runoff seeps into the local rivers and groundwater, polluting the environment and ruining their health.

You go to a supermarket and all the meat is neatly cut and portioned for your convenience. You don't know, or probably even care, about how many people lost their fingers doing this service for you. You don't see the animal that gave up its life for it. Roughly 9.5 billion animals are slaughtered every year in the US. For beef, slaughterhouse workers are expected to kill an average of one cow every 12 seconds. They suffer from incredibly high rates of PTSD, not to imagine the incredible physical toll it takes on their bodies.

Most people, even myself included, are content with not seeing and not knowing how the everyday conveniences we enjoy came to be. We are happy going about our day only thinking about our problems and how to overcome them. It's exhausting taking care of yourself, let alone people you don't even know, who are thousands of kilometres away. I get it.

But every so often, the veil in front of your eyes lifts, just for a moment. You see the world in a way that you don't usually. The beauty of it. The cruelty of it. The crushing injustice of it all that makes your heart sting and your stomach hurt. The extraordinary privilege that you have, as someone who is able to read, write and live on our humble little blue dot in an uncaring universe.

Why are we so lucky to be able to live without having to know how the proverbial sausage is made? We live in a world where we have robots and wireless internet, is it so hard to make life a little better for everyone, not just those that live in rich countries? I scream at my sausage. But the sausage says nothing. Just like 99% of people who'll enjoy this tasty food today, it doesn't give a fuck how it was made.

yummyPi

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WHEN IT'S NO LONGER THERE

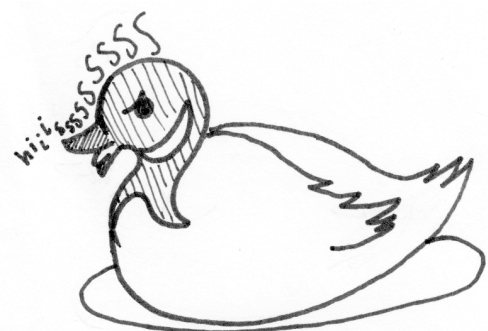there's a comet outgassing into my gut.

focusing on it; I get the shivers.

I hope it burns up after reaching the sun

but then

who will I become?

CommonDiyar

A SHORT TRIPTYCH

What follows are three essays based off of the comic strip series *A Softer World.*

Specifically, #227, "we buried truth under playgrounds", which is potentially my favourite comic strip ever (located at https://asofterworld.com/index.php?id=227).

The entire text of the short strip is contained in the headings of these essays, reading in sequential order.

TRUTH AND BEAUTY ARE WONDERFUL WORDS

If you asked me in high school, I would say that truth was the most important concept of humanity. If we could determine the objective facts that nobody could disagree with, from there a solid basis of understanding could emerge.

But reality is more squishy than that, and while truth helps in finding common ground, it doesn't always speak to people's feelings.

It can be tempting to say that, instead, we should focus on creating beautiful things, things that speak to human souls and build understanding through appreciation.

But different things speak to different people, and tastes change over time. Beauty is in the eye of the beholder, and therefore insular.

If truth is too hard, beauty is too soft. At the end of the day, the only thing that matters is how people feel and whether they're cared for. It's really the only metric that really stands up to the test.

All truth and beauty are… is just words.

BUT SHRAPNEL IS SHRAPNEL

I still feel the pieces, sticking out of me.

I was only the collateral damage, just the person around when it happened, but the shrapnel pierced me when I was young, and it's still there to this day.

The broken, foreign objects lodged in my psyche.

I can try to dig them out, with therapy and the like, and it helps… to a degree. But it's there, and when I let myself get close to others, I know they can see it and feel it, too.

It holds them back.

I've learned to accept some of it as part of me. Some of it I reject, the bits that I still have a hope of removing.

But all my cells get replaced over time, and the shrapnel doesn't. At what point does it become more me than the bits of myself that I think of as me?

AND AT THE END OF THE DAY, I AM ALONE WITH THE THINGS I HAVE DONE.

The future scares me.

I struggle to imagine what it even looks like. I graduate in less than a year, and then what? I remember having this same feeling at the end of high school, trying to put things in order. What to keep in my life, what to remove, as I moved into a new phase of life.

The problem is that the things that you want to keep aren't always the things that you have control over.

Everything feels like it's slipping. My hopes of finding a good job post-graduation, thanks to a company reneging on their offer leading to a failed co-op term. My relationships with some of the people in my life, who don't seem to care about me as much as they once did. I'm even in a weird transition period with my main hobby, writing, where I need to figure out what I want to work on going forwards.

I look at my past, and I look at my present, and as I look to the future I try to piece together a logical next step, try to figure out what it could look like. But it's like there's a void there, and I don't think I can trust anybody else to help me put the puzzle together.

There are a lot of people I could be, I'm certain… but for now, I'm just me, and I can't see any of them, as I gaze ever deeper into a past that supplies me no inclination of where the future lies.

I guess I'll just have to stumble through the liminality of it all and see where I end up once I reach the other side.

Predap

TOP N AMOGI
SUS

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boldblazer

FEELING LIKE A 4TH YEAR

Many of my friends and I have discussed how it's so weird that we're "in 4th year now" and how the term suggests a level of maturity we don't seem to possess. A lot of us feel like we aren't experienced enough to be so-called "upper-years". But, when I look back on my first-year self, it's a bit like elementary school when you learn that humans evolved from some single-celled organism. In many ways, I feel like the years I've spent at Waterloo have moulded me and aged me into a different being. I've (mostly) learned not to drink to the point of public embarrassment, I'm chipping away at the imposter syndrome, and I've probably written hundreds of proofs.

Even more, I have such lovely people in my life who have taught me so much, some of whom I've known for years and some of whom I've met more recently. The community I've built for myself here has genuinely made me a kinder, more confident, stronger person because of how awesome it is. A community that plays sports as silly as Innertube water polo with me, tolerates my incessant complaining about extra-curriculars I *chose* to do, and just improves my life immeasur-ably. Special shoutout to my roommates, whom I've known since prehistoric times (residence). Moral of the story — I feel like a 4th year in the best way possible.

peacelovemath

PSA: THE NETFLIX ADAPTATION OF ONE PIECE IS ACTUALLY REALLY GOOD

The curse is broken. All the memes have ever said is that Netflix adaptations are bad. I don't know how they did it, but am I sure glad they did. By the way, I have never watched or read the anime or manga of One Piece. But I have spend two years in a One Piece D&D campaign with my high school friends and read a bunch of lore on the One Piece wiki, so I know what I'm talking about.

It was with said high school friends that I watched this adaptation, and only because they all were watching it. But holy crap, it's really fucking good, and it got me invested in the story to the point where I am legitimately considering starting the manga.

It's funny and emotional just like the original (or so I'm told, I haven't seen the original), and all the actors play their roles really well and stay true to the characters' personal-ities (as they are according by the wiki). A season 2 is already confirmed, and thanks to the writers strikes it will almost certainly actually happen. I just hope Netflix knows what

they've gotten into, cuz they're gonna have to keep making this until the sun blows up.

The fact that there are only 10 episodes means you get the illusion that watching the Netflix adaptation comes without the commitment that watching the actual series does, but it's a trap! Now I feel compelled to read 1000 manga chapters someone help!

In conclusion, 10/10 sell your soul to the funny stretchy pirate boy.

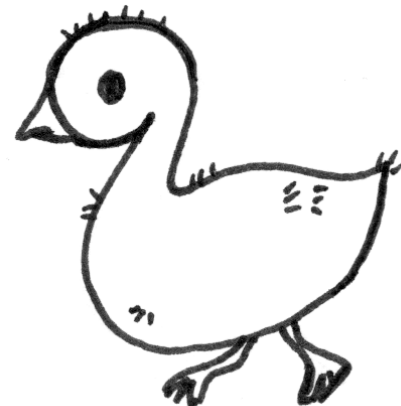*someBODY*

RUBBER DUCK DEBUGGING

Have you ever had problems with your code? Does debugging your code take longer than writing the code itself? Well, you should probably do some unit testing and test each component of code as you write it to make sure it works properly (and make sure to test the edge cases too). But if you're one of those people that writes code before doing any testing (like me) and then stares at your code for hours trying to figure out where it went wrong (also me), you can make your debugging sessions more effective (and entertaining) by using the rubber duck debugging method!

The process goes something like this:

1. Get a rubber duck.
2. Explain line-by-line to the duck what your code is supposed to do and what your code does.
3. At some point, you will realize the issue with your code.

The method works because explaining your code out loud to someone helps you process it. But humans are busy and might not want to hear you explain your code to them. So a rubber duck is deemed to be a suitable substitution for a person. It even squeaks! You can check out more details at rubberduckdebugging.com.

mathgeek

PLEASE PRETEND THIS IS FUNNY.

PLEASE PLEASE PLEASE PLEASE PLEASE PLEASE I'M BEGGING YOU PLEASEEEEEE

Please pretend this is funny. I want you to give you three (3) jolly chuckles exactly when I tell you to. No more than three—then it's too suspicious; it's not that funny. No less than three, because then it's not funny enough. Why do I need you to laugh at this post? Because I'm desperate. I'm at my co-op job right now, and I've spent the week procrastinating on my tickets. All I've done since Monday was try to write up a **mathNEWS** article. Today's Thursday. This is all I was able to come up with. It was either this or an article about the time I got my pinky toenail tore off for a Tootsie Roll. *[Editor's note: bro?]* Okay, ready? Now laugh. I'll wait for you to finish. Done? Alright, thank you, I appreciate your validation. Except for you, John, I noticed you only released one (1) sharp exhale from your nose. I'll keep that in mind. Don't think I'm not always watching you. Anyways, for the rest of you, please enjoy the rest of your day. Please keep laughing, even if there's nothing funny to laugh at.

rishu

CAN WRITING FOR mathNEWS FULFILL MY COMMUNICATION REQUIREMENTS?

Asking for a friend… or academic advisor. *[Editor's note: In our hearts, yes.]*

Whole Number Haver

Here at mathNEWS, we're not afraid to ask your toughest questions.

Of course, that doesn't stop us from posing your idiotic ones too.

THE mathASKS AMBASSADOR

CODING IN THE PARK: A GUIDE

Want to enjoy the warm weather while it lasts, but have a bunch of homework from your CS classes to go through? Want to beat the stereotype of CS students not going outside? Or just looking for a quick and easy mental health boost?

Try coding in the park! Here are some of my favourite spots:

PETER RUSSELL ROCK GARDEN

The beauty of this one is it's just outside MC, so not a very far walk from where you picked up this issue of **mathNEWS**. Just leave through the south entrance and it's there. There's Wi-Fi, shade, and just the right amount of background noise.

SILVER LAKE

That's the little lake in Waterloo Park, and they recently installed a new walkway and some nice benches on the north side of it. There's a pretty strong eduroam connection here for some reason! No idea where it's coming from, I guess the Perimeter Institute? But I'm all for it! There are also outlets near some of the benches in case you have one of those gamer laptops with batteries that last 20 minutes.

UNIVERSITY OF WATERLOO DISC GOLF COURSE

To get here, walk north on Hagey Blvd north of Columbia, and then turn left. There are a few benches here overlooking Columbia Lake, and it's one of the prettiest views you can get within a 5-minute walk of campus. The disc golf players won't bother you. No internet here, but I'll point out that this is the place where I had a pretty significant breakthrough while working on an ECE 350 assignment. There's something in the air here.

THE ION

Not really a park by any definition of the word, but you can see parks out the window I guess? Anyway, if you catch a train when it's not too busy and you can get a window seat in one of those four-sear clusters, it can be a great place to work. The window ledge is the perfect size to hold a cup of coffee. The GO train works too—it gives you a longer trip time, the way it rocks gently while moving at high speed is relaxing, and there's a better chance you'll get a four-seat cluster to yourself—but it's not free, and the cupholder situation is much worse.

__init__

BEEP BOOP NEW gridWORD

gridCOMMENT *153.2*

hello!!! ;000

welcome back to a new (and very epic) **gridWORD**, i hope things are going well so far for everyone! reading week officially starts next week (from release of this issue) so hopefully everyone gets a good break (to do **gridWORD**s) (not threatening).

i asked you last time, "what is the weirdest thing you would do for $5?", to which you said:

- MJ: *sending this to you lol*
- terminally sane: *show up to a lecture wearing a sleeping bag*
- sunnnysideup: *spend 1hrs 47 mins 16 seconds and 19 millisecond solving a gridword*
- __init__: *idk I bet I could walk to Cambridge or something*
- awmlet: *skip work for an hour to pick up a $5 cnd giftcard I got for doing gridword*
- Partly Cloudy: *sell my feet pics*
- nike: *I'd do anything for money (sent cat pic (hammer))*
- urglgrgl: *eat 5 dollars*
- Rijrya: *french kiss a salmon*
- Calico Cats Galore: *I would dogear a library book. >:)*

dearest spaghettiinhalers, you had submitted the orientation issue which is very sad (although i'm sure you would've solved it anyway :o) i'll see you again next week haha. there are so many solutions this time :0000 but special thanks goes to nike for sending a picture of their cat hammer, whos goofy ahh lookin has let them win the prize. nike, please come by the **mathNEWS** office (MC 3030) sometime to collect :o

i forgor to explain the theme last time, it was just "stuff around my room" cause idk anything and brain is what some people may call, scrabbled egg.

this, time the theme is "thanksgiving", cause the holiday is soon, and thus it is time to eat 10 pounds of food because we can. i also ask this time, "who should be on the $5 bill instead of sir laurier?".

please send **gridWORD** solution, along with a **gridQUESTION** answer and your pseudonym to mathnews@gmail.com by october 16th at 6pm, and i'll see you all there :oooo

have a good reading week everyone xoxo

Wink wonk

ACROSS

1. Get going
9. What you do during the holiday*
14. Mass in motion
15. Short garment
16. Small sharp-pointed tips
17. Cry of triumph
18. Beyond a certain limit, abr.
19. Big laugh
20. Like you see on sheet music
21. Bogus
23. Pie choice for the holiday*
25. Big heart?
26. Aromatic compound
28. House-clearing event
31. Like some rolls
33. Seasoned rice dish
34. "The way things are…"
36. Assuredly
39. Animal stomachs
41. Got more out of
43. Wild parties
46. Person with a mike
47. "Thar ___ blows!"
48. Sleep disorder
50. Back of the neck
51. Why we celebrate the holiday*
54. Software program, briefly
56. Drink from a dish
57. Light reflection ratio
58. Authority of an umpire
60. 40th U.S. president
61. Explores by touching
62. Muhammad's religion
63. Most expensive

DOWN

1. Levies
2. Waterway between the United Kingdom and Denmark
3. Parrots
4. P.I.
5. Pitch-black
6. Really enjoyed
7. Common meat for dinner*
8. Dash lengths
9. After three
10. Noble
11. Of a heart chamber
12. Rap session?
13. Little laugh
15. "Friends" friend
20. Re atmospheric weight
22. Physician
24. Spending limit
27. Hardly modern
29. Eastern wrap
30. Season assoicated with the holiday*
32. Full-toned organ stop
35. Used a broom
37. Intensify
38. Slow leaks
40. D.C. V.I.P.
42. "___ condolences"
43. Pod cast?
44. Kind of tea
45. Crusty ocean growth
47. Deadwood on the main trunk of the bonsai
49. Like another pie you have during the holiday*
52. Lyra's brightest star
53. ___ cheese

55. Snowman prop
58. Downs' opposite
59. Popular music category

LAST ISSUE'S gridSOLUTION

T	R	A	N	S	P	I	R	E		T	H	R	O	E
H	E	S	I	T	A	T	O	R		Y	E	A	S	T
R	E	I	T	E	R	A	T	E		L	A	M	I	A
O	F	F		P	I	L	E		B	E	V	I	E	S
		P	I	T	Y		V	E	N	E	E	R		
L	E	M	O	N	Y		L	O	G	O	N			
A	R	A	K	S		M	E	T	A	L	W	O	R	K
I	S	L	E		C	O	V	E	T		A	R	E	A
R	E	I	M	P	O	S	E	S		C	R	E	A	M
			O	R	I	E	L		R	A	D	O	M	E
	C	A	N	O	N	S		W	E	T	S			
T	I	N	C	T	S		M	A	N	A		T	I	E
A	L	G	A	E		M	E	T	A	L	W	A	R	E
C	I	R	R	I		A	T	E	M	P	O	R	A	L
H	A	Y	D	N		T	H	R	E	A	T	E	N	S

For the record, although I did once say "there is beauty in mathematics", I did not then add "and it is me".

STEPHEN NEW

lookAHEAD

mathNEWS ARCHIVES FINALLY COMPLETE; DEATH TOLL IN THE MILLIONS

After just about two whole calendar years, a myriad of inexplicable file corruptions and hardware failures, and an untold number of collective lived hours of **mathNEWS** Editors pressing a big red button at the Kitchener Public Library over and over again, I am proud to announce that **mathNEWS'** *Official Public Digital Archive Of Every* **mathNEWS** *Issue Ever Except For That One Issue From 1977 That We Couldn't Find* is finally complete. Except for that one issue.

This archive contains scans and original PDFs of every* **mathNEWS** issue going back to January 25, 1973—the very first issue. This project has been in the works for a long time and has comprised several generations of Editors. Thanks to everyone who came out to help, and thanks to god ⚡ peED for dragging me out to help before I became an Editor.

You can browse the archive on our website, mathnews.uwaterloo.ca. Use the sidebar on the left to navigate between years and months. And if you suspect you might know anyone in possession of **mathNEWS** 14.2 (published in May or June of 1977), or if there are any broken links, send us an email at mathnews@gmail.com.

evaluatED

THIS ARTICLE BETTER BE VERTICAL

By vertical, I mean the text in this article, including the title, should be perpendicular to the usual direction of text in this issue. Oh, and the text better be selectable in the PDF.

As an incentive, here's all the other writers that would be very angry if this article did not end up vertical in this issue, or not in this issue at all: hyperlynx, andoiii, RapidEyeMovement, sexy_software_babe, Pizzeudonym, __init__, mathgeek, Shahabee, someBODY, aphf, Percy's Mom, Percy's Mom's Friend, WholeNumberHaver, molasses, cherry ♡, 0.423, yalevoylian, Fried Rice, sunrise parabellum, CommonDiyar, Dick Smithers, Popcorn Rock Eater, floot, big a, cats>geese, Dollar Store Person, Aspiro, h, UW Unprint, water, χ, alyssnya, Lars Nootbaar, AkariGirl252.

aphf

THE CABOOSE

There once was a publication whose
Last page was very seldom used
'Cept a grid**WORD** solved
And look**AHEAD** installed
Yesthisisablatantattempttogetmyarticleon
thelastpageof**mathNEWS**

terminal